Dairy cattle judging
and
selection

NEW YORK • JOHN WILEY & SONS INC

London • Chapman & Hall, Limited

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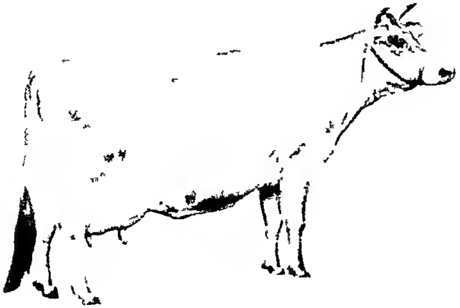

Library of Congress Catalog Card Number 58-14219

Printed in the United States of America

Preface

As the portals opened to the current century, the great need in agriculture and animal industry was the acquisition and accumulation of facts If agriculture was to assume the stature of a science in our colleges and universities, it must put on its mantle also It could no longer appeal to authority, as it had done in the previous century, because there was no recognized authority to appeal to Clearly then it was its job to find facts—to conduct a determined search for the truth

It was at this juncture that the experimental approach in the search for truth came into its own The experimental method proved to be popular in agriculture, and it was pursued until it became almost a crusade for truth There is little doubt but that this was the best thing that could have happened to agriculture For it changed the basic concept from an empirical to a scientific approach—from the appeal to traditional authority to a controlled study of animal, plant, and soil behavior

Subsequently, throughout the years, research has been piled upon research until we have built up a huge stockpile of information—perhaps more than we have been able to interpret and make use of effectively Possibly we may even have reached a stage

when many consider the products of research to be the only source of truth

The search for truth, however, is not confined to the test tube or the laboratory, important as we have learned to rate those means for locating truth A fact observed and not challenged for validity ultimately becomes accepted as the truth In our search for the facts about the physical characteristics of dairy cattle, we have need for both the findings of research and the knowledge gleaned from the experiences of that great hoard of folks who live by producing the products of the cow To recognize this dual need is the responsibility of both the dairy scientist and the dairyman A spark plug as you know, works best when the gap is neither too large nor too small

The mammary gland of the cow is a basic component of the dairy industry But it cannot be dissociated from the cow The kind of cow the udder is attached to is of great significance to the dairyman, for it is the most important ingredient in his operating plant It determines the efficiency and durability of his enterprise A dairyman or a dairy scientist, therefore, is at his best if he knows a great deal about dairy cows

This book is dedicated to the task of revealing the interplay between the physical qualities of a cow and her function as a producer of milk The ideas and facts presented have been gleaned from research and breeder experiences, both winnowed to remove the chaff and time tested to prove their validity It is hoped that the treatment is profound enough to satisfy the scientifically minded and practical enough to serve the needs of devoted dairymen

The more glamorous aspects of purebred dairy cattle production are also recognized The show ring, herd classification, junior projects, fitting and exhibiting dairy cattle all are included In all these aspects of the physical make up of cattle, the bond between science and practice, the physical and functional, has been preserved

This is definitely a textbook on the physical characteristics of dairy cattle It is written in the hope that it will also, among other things, aid the student to improve his diction and enhance his ability to communicate his ideas—a shortcoming often em phasized by employers of agricultural graduates Yet it is more For it can also serve as a compendium of information for all who have an abiding interest in cattle or are beholden to them for their livelihood

It is impossible to include by name all the persons who have contributed ideas to the author A few perhaps more than the others have encouraged and inspired him to attempt this book I wish to acknowledge a debt of gratitude to such cattle men as H H Kildee, W H Moscrip, Ed Harrison, Fred Pabst, Chester Folck, Fred Idtse, Louis Seitz, K C Sly, all devoted cattle men who advised and encouraged me in my early efforts to learn more about dairy cattle

Then to these truly great students of dairy cattle no longer with us I am urged to pay tribute T S Cooper, Duncan Bull, Tom Dempsey, Charles and Wilbur Marsh, "Pete" Small, Frank Barbor, John Hetts, and F Lathrop Ames, all of whom aided, inspired, and encouraged me when I needed it most

I am also deeply grateful to the secretaries of each of the Pure bred Dairy Cattle Breed Associations, The American Milking Shorthorn Society, and the Red Polled Cattle Club of America for material provided and photographs supplied Especially am I indebted to my colleague, Professor E E Ormiston, for ideas and suggestions, to Professors R P Niedermeier and G M Werner, both of the University of Wisconsin, and Professor Paul M Reaves of Virginia Polytechnic Institute for a critical reading of the manuscript and their many helpful suggestions, to Roy T Shirley, Supervising Farm Foreman, Dairy Science Department, for pre paring animals to be photographed, and to H H Strohmeyer Jr, and J T Carpenter, and F C Wetmore for illustrative material

William W Yapp

October 1958

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chapter 1

The basic concept of functional dairy cattle judging

Man, by taking advantage of the maternal instincts of the cow has through his hyperdevelopment of her mammary system established the ingredients for a great and highly beneficial industry. But nature has also provided the cow with another basic asset—a prodigious digestive system: a system that supplies its own fermentation vat, in the form of a rumen; a mechanism that enables the cow to utilize efficiently cheap sources of feed nutrients and even to synthesize from them biological products essential to her existence.

Put these things together, and add to them the ability to reproduce herself and with a favorable recombination of germ plasm occasionally to actually improve on herself, and you have the dairy cow. Now this cow may be said to have two sides: a physical and a functional. The two are interrelated, and they should be studied together. To neglect either is to fail to reach a full understanding of the animal and her complete role in the conduct of the dairy industry.

Most Cows Must Be Judged On Physical Conformation

From one year to another the number of dairy cows in milk in the United States varies considerably. But year after year the

average number of milk cows centers about a mean of from 20 to 22.5 million cows. To provide replacements for these cows, there are growing up in barns, lots, and pastures roughly 12.5 million calves and heifers.

A considerable number of the better cows are tested each year to determine their production. Furthermore, the milk and fat yields of these cows, whenever possible, are used to forecast the production potential of their progeny. This is good management practice, a sound basic policy, and more cows should be evaluated in this manner. But the great majority of this vast herd of milking cows and their young stock have nothing but their form and appearance to guide their owner or a purchaser in determining their competence and value. It is with this group that judging is basically important and occupies a highly significent position in dairy cattle selection.

Let us be more specific. In the United States in the year 1955, 1,333,866 cows were tested for production in some 2288 Dairy Herd Improvement Associations. Another group of 155,835 cows consisting of the major dairy breeds were tested by the several Purebred Dairy Cattle Breeders' Associations in their herd improvement testing programs. Still another group of 12,139 cows were tested by these breed associations in Advanced Registry under more exacting testing rules. To these regular and well-established systems of testing for yield, there might be added by estimate still another 125,000 cows tested by such groups as (1) various owner sampler programs not included in D.H.I.A., (2) milk processing plants for the convenience of their patrons, (3) vocational agricultural teachers in special projects, (4) owners for their own information, and (5) weigh-a-day-a-month plans. If we put all these methods for determining production together, we find that a maximum of 1,626,835 dairy cows were tested or could have been tested for yield. It would appear then that approximately 7.23 per cent of the dairy cows in milk in the United States are tested for production by our present programs each year. Table 1.1 presents these facts in a more detailed form.

The evidence gleaned from this table indicates that approximately 92.77 per cent of the cows in milk are not regularly tested, if tested at all, to determine their milk-yielding capacity. This provides a broad field for the application of the more general method of estimation of productive capacity and competency by judging and selection.

Furthermore, all cows that are of the same age and size, even

though they may be similar in inheritance and production, do not have equal value Much of their dissimilarity in value, we find, is due to conformation differences and to eye appeal Both are real and meaningful differences and they can be estimated by competent judging

TABLE 1 1 Number of Dairy Cows Tested for Yield, with Agency Testing, during Year 1955–1956 *

Breed	*Agency Testing*	*Number Tested*	Per cent of All *Milk Cows*
All breeds and grades	D H I A	1,333,866	5 93
Holstein–Friesian	H I R	74,417	0 33
Holstein–Friesian	A R	1,713	0 088
Holstein–Friesian	D H I A acceptance	498	0 002
Jersey	H I R	29,465	0 13
Jersey	A R	1 162	0 005
Guernsey	H I R	28,244	0 12
Guernsey	A R	8,268	0 04
Brown Swiss	H I R	8 404	0 04
Brown Swiss	R O P	498	0 002
Ayrshire	H I R	15 300	0 07
All other agencies (an estimate)	All forms not indicated	125 000	0 56
Total Tested		1,626 835	7 23

* It should be emphasized that there is some duplication in these values For example many H I R records are made by cows that are concurrently being tested in D H I A

There is a general current tendency for the total number of milking cows in the United States to diminish each year whereas testing for production and average yield tends to increase

There Is a Relation between the Form of an Object and Its Function

In the field of mechanics we have but to look about us to note that the design of a piece of equipment changes materially if the function is changed The jet-powered airplane, capable of traveling faster than the speed of sound (which in dry air at 32° F is approximately 1087 feet per second) looks very different from the *Spirit of St Louis,* now a museum piece, which Charles Lindberg flew nonstop across the Atlantic Ocean If we require more evidence in the field of mechanics, we need hut consider the automobile Currently designed to travel at speeds of 100 miles per hour, it has vastly different lines, engine power, center of gravity, stream

lining, and eye appeal from the "horseless carriages" of our grand father's day There is a vast and dramatic design difference also between the well known common radio tube and the newly invented and much more durable transister What we are saying and em phasizing is that, in the entire field of mechanics, an area extremely important in our daily lives, design and form are definitely correlated with function

This same principle can be applied to the biological field Perhaps in this great and important field there is not a better example of form and function relationship than the dairy cow Visualize, for example, the difference in appearance between the primitive cow (Figure 1 1) or a beef cow (Figure 1 2) and one of our super dairy cows (Figure 1 3), the last named having actually yielded upward of 19 tons of milk in a 365 day lactation This amount you will note is approximately 22 times her body weight when she is in the stage of heaviest milk production Wide form differences of this character are easy to visualize, and a person without any experience or training at all can readily recognize the physical variations among these three animals Of course, the physical differences between cows that are more like each other than those pictured are less easy to distinguish, and it requires skill, acquired by training and experience, to evaluate properly these less obvious qualities

Many research workers have, however, endeavored to apply actual measurements to the physical characteristics possessed by an animal and to compare them with her functional ability—in short, to find the relationship between the form and the function of an animal, to actually measure the degree of similarity between body measurements and milk yield

A Correlation between Form and Function in Cattle Has Long Been Recognized

Let us first explain what is meant by the word "correlation" A correlation is said to exist between two characteristics or values if a change in the values of one affects the values of the other The coefficient of correlation (a mathematical measurement of correlation indicated by the symbol *r*) is the measure of the degree of association between two or more measurable characteristics or values For example, height at withers in a heifer or cow is positively associated with the weight of the animal As an animal becomes taller, he or she increases also in size and weight Thus

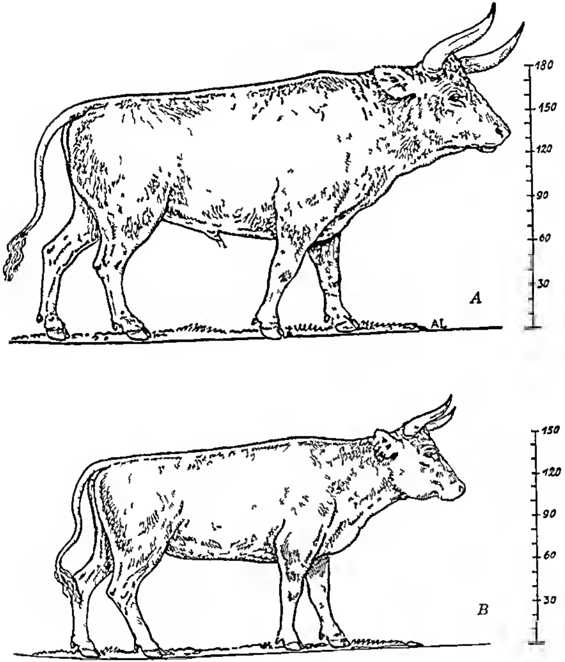


Fig. 1.1. It is impossible to obtain photographs or original drawings of the earliest ancestors of domestic cattle. These scale drawings (expressed in centimeters) of a primitive bull (A) and cow (B) were carefully made from the measurements of bones, skulls, horns, etc., of the fossils of *Bos Primigenius*. The reconstructed drawings therefore resemble the original animals as closely as it is possible to approximate them. Courtesy of Dr. Joachim Boessneck, Munchen 13, Tieranatomisches Institut der Universitat, Schwere Reiterstrasse 9, Deutschland.

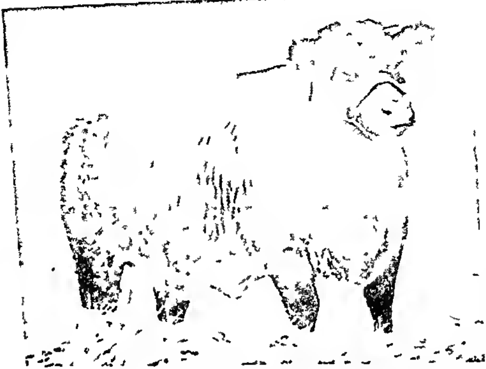


Fig 1 2 One of the finest specimens of the Shorthorn breed of beef cattle Leveldale Crocus By hundreds of years of breeding and selection for beef conformation this magnificent animal has been developed from early ancestors that were similar to those portrayed in Fig 1 1 Crocus was many times made grand champion at leading national shows (Courtesy L. E. Mathers owner Mason City, Illinois)

we state that height and weight are positively correlated But correlations need not necessarily be positive, they may also be negative

An example of a negative relationship, also in cattle, is between the average milk yield, especially lactation production, and the per cent fat content of milk. As the milk yield of cows increases, there *is a tendency for the per cent fat content and also the per cent of* total solids to be somewhat lower This we speak of as a negative correlation If we find no relationship or association between two values or characters, if in fact an increase in one value has no effect upon the other, we then consider that no correlation exists In a perfect positive correlation $r = 1\ 00$, in a perfect negative correlation $r = -1\ 00$, and, if no correlation is indicated, $r = 0$ Less perfect correlations are expressed decimally, either negative or positive as the case may be This brief reference to the mathematical

concept of correlation is intended to make the following discussions more meaningful

Anatomical Dimensions and Live Weight

In order to understand and appreciate that there is a hard core of facts underlying the newer concepts of dairy cattle judging, it is well for us to learn how such views about judging have come into being Early in the last century, upward of 100 years ago in fact, research workers were endeavoring to establish the relationship between body dimensions and weight of animal In France, it was Quetelet and Crevet, in Germany, Pressler and Korreng among others, who were working on various mathematical expressions to estimate weight from body dimensions This was important to them because live weights were difficult to obtain

Their approaches to the problem were both interesting and ingenious For example, Quetelet assumed that the specific gravity of a live animal was one In other words, the weight of an animal was equal to the weight of the amount of water it displaced In

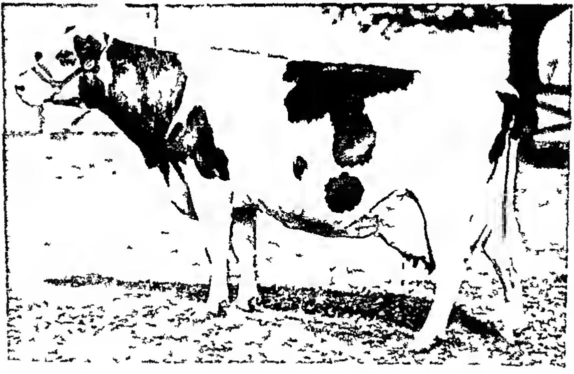


Fig 1 3 Haven Hill Crescent Gewina Count portrays equal achievement, but in an entirely different function For she became the world s champion Holstein Friesian cow for butterfat production She illustrates a maximum accomplishment in selection for dairy characteristics

this assumption he was almost correct Experiments conducted at Wisconsin on 11 different animals indicate that the specific gravity of the animal body as a whole is 0 9694 ± 0 0168 Quetelet then compared the animal body to a cylinder and developed the formula

$$V = W = R^2h$$

where V = volume or, in this case, weight
R = radius of the cylinder
h = length of the animal's body from shoulder point to pinbone

Crevat, on the other hand, considered the body of an animal to resemble a cube and developed his formula as follows

$$P = MX^3$$

where P = live weight
M = a special coefficient equal to
100 in calves
90 in young animals
85 in thin animals
80 if in good flesh
X = some linear dimension, in this case, the heart girth

Pressler also approached his problem with the concept that an animal resembled a cylinder, but he used different measurements of the animal to provide the basis for his formula

It is true that these are rather crude attempts to determine live weight from body measurements, but, much more important, what these investigators really contributed, was a scientific approach, ineffectual as it was, to animal production problems The second phase of this type of approach was an effort to estimate dressing percentage in the live animal

In this area of study we must add the names of David Low,[2] E Movalat, Anderson, Baron, Dombasle, and others The formulas that they developed, and there were many of them, were quite complicated since it was necessary to make adjustments for age, type of animal, condition of fleshing, etc, in addition to size But

W W Yapp A Dimension Weight Index for Cattle Ph.D Thesis University of Wisconsin, 1923

[2] David Low *The Breeds of Domesticated Cattle of the British Islands* with drawings by W Nicholson, Longmans Orme Brown Green and Longmans, London 1842

it remained for Severson and Gerlaugh[3] to use the coefficients of correlation between the actual body measurements and flesh deposition and the rate of gain in cattle. They found, for example, that there was no correlation between the initial live weight of a steer and his ability to gain in weight over a fattening period of 140 days. They did find, however, a positive correlation between the initial chest circumference and rate of gain of 0.238 ± 0.053, initial width of thurls and rate of gain of 0.224 ± 0.054, and initial circumference at rear flank (loin region) and rate of gain of 0.221 ± 0.053. All this discussion up to this point is intended to show that early research workers were attempting to build a body of core knowledge to aid livestock men in solving some of their problems. To this end, production records on dairy cows provide even a more valid basis for setting up bench marks from which to study the correlation between form and yield than does live weight or dressing percentage.

Anatomical Measurements and Milk and Fat Yields

Korreng, a German, was among the first to demonstrate by accepted biometrical methods a positive correlation between certain measurements of a cow and her milk yield. He showed that there was a positive correlation between width of jaws and production. He was, of course, dealing with a size measurement, and since that time Woll,[4] Misner,[5] and others have shown that size of animal is modestly correlated to yield, especially milk yield. One other early piece of research should be mentioned in these basic studies. Gowen[6] studied the score card ratings given by some 140 different well-known judges to 1674 Register of Merit Jersey cows which were scored on the basis of a physical examination. Seventeen of the 19 separate evaluations studied by Gowen showed a positive correlation: that is, some degree of similarity, that was more than three times their probable errors. Of these measurements or evalu-

[3] B O Severson and Paul Gerlaugh, A Statistical Study of Body Weights, Gains, and Measurements of Steers during the Fattening Period, *U S D A J. Agr Res*, XI(8): 383–394, 1917

[4] F W. Woll, Studies in Dairy Production, *Univ Wisconsin Agr. Exp Sta Res Bull. 26*, 1912

[5] E G Misner, Relation of Size of Cow to Production and Cost of Production of Milk, *Cornell Univ Agr. Exp Sta Bull 719*, 1939

[6] J. W. Gowen, Conformation and Its Relation to Milk-Producing Capacity in Jersey Cattle, *J. Dairy Sci*, 3 1–32, 1920

ations, the total score had the highest correlation to yield, it was $r = 0.1941 \pm 0.0160$. Other correlations were milk veins and yield, $r = 0.1908 \pm 0.0160$, size and condition of udder to yield, $r = 0.1906 \pm 0.0160$, and size and shape of barrel and milk yield, $r = 0.1657 \pm 0.0161$. The interpretation placed upon these correlations by the author were that they did show a positive relation, but that the correlations were too small to be of much value in cattle selection. In subsequent chapters, form and function correlations will be more fully discussed.

What we have not fully appreciated is that improvement from generation to generation is usually very small, and that these small gains are of tremendous importance in the over all improvement of cattle. Perhaps in our approach to cattle improvement problems, both in type and yield, we have been too hasty and too eager for rapid improvement to be willing to apply steady selection pressures over the long pull of many generations. Facts, the understanding of them, and patience in their application are the most important tools of dairy cattle breeders.

A Good Judging Program Is Designed to Improve Both Form and Function

Many different qualities contribute to the value of an animal. These may, however, be broadly placed in two categories: physical and functional. Both of these bear a close relation to, and to some degree are a product of, environment. Likewise both depend to a major degree upon inheritance. The final characteristics of the animal are then determined by inheritance, environment, and the interplay or interaction effect between them. In teaching judging or in learning to judge, it is especially important to recognize these relationships. A correct interpretation of the meaning of inheritance and management and their interaction is the essence of judging.

It is not too difficult for the student of physical conformation in dairy cattle, especially milking cows, to interpret conformation differences as they influence functional qualities. It is not especially difficult either in most instances to separate the good producing from the low yielding cows, good udders from poor udders, weak animals from strong vigorous ones, or characteristics that improve in the aging process from those that get worse as the animal matures. The proficiency and consistency with which this can be done, however, measures the competence of the judge.

The Value of Eye Appeal

Unfortunately, there are some who hold the opinion that eye appeal in an animal is negatively correlated with good producing ability. Persons with this view either have the wrong idea of what "good type" is in an animal, or they are not competent judges of the physical characteristics that indicate producing ability. For such a concept is not confirmed by facts or held by competent dairy cattle breeders.

Highly desirable conformation or eye appeal is prized by dairymen, and the value of an animal, especially a purebred animal, is enhanced to the degree it possesses the quality, assuming, of course, that at the same time it exhibits the even more highly prized dairy characteristics that any good dairy animal should possess. Let us then recognize eye appeal for what it is; namely, an added advantage or asset to an animal; that the possession of the quality in no sense negates its functional value; that eye appeal in dairy cattle is just as real and valid as good design is in the appearance of an automobile or good grooming and personality are in a person.

chapter 2

Qualities that characterize a good judge and the techniques required in judging

Many of our very best judges of dairy cattle have never placed a ring of animals at any major show or fair. They are, however, students of conformation. As such, they are recognized authorities and their opinions are sought by many breeders. A good judge is never satisfied with his knowledge of cattle. He must endeavor to be a student of animals, inquire often of persons who know a great deal about them, and also read extensively in the literature that has dealt with the research concerning cattle. Knowledge of this character cannot, however, be gained entirely from books, papers, and journals. It demands also constant observation of the animals themselves as they are found in various environments and under different situations. Furthermore, it requires the study not of a limited number but of many animals. To which there must be added an enthusiastic and abiding interest in both the animals and the people who enjoy working with them.

An Awareness That There Are Honest Differences of Opinion in Evaluating Animals

A good judge of dairy cattle never overestimates his own opinion of an animal or underrates the judgment of another. If he does

either, he has lost the ability to learn, for he must then defend his opinion. His mind is no longer open because he is merely searching for arguments to support his views. He is not, when defending an opinion, searching for the truth about the animal.

Judging Requires the Making of Decisions

The word *judge* implies an ability to compare facts or ideas, perceive their relations or attributes, and thus arrive at a decision. Judgment is an operation of the mind involving comparisons and discriminations based upon a previous knowledge of values. In judging dairy cattle, the problem is to evaluate a three-dimensional object in terms of other similar objects or in terms of a previously established concept. Without a sound concept of what a good cow should be, judging cannot be meaningful.

Establishing a Concept

Cows do not necessarily look alike, but they possess many common characteristics. As judges we are interested in both their similarities and their differences. Two people do not view the same object exactly alike. What they see is evaluated in terms of what they have seen before. It requires an accumulation of experiences to produce a concept. But experiences alone do not provide an adequate basis for the formulation of an ideal. It is only after these experiences are compared with each other that an idea is gained or an opinion formed. Thus a concept of the goodness or badness of an animal is gained only after a series of observations have been made upon different animals and these are studied reflectively in terms of each other.

To become a good judge, it is necessary to study a large number of animals that possess a variety of characteristics. These animals are compared to each other, part by part. A mental image is thus formed of the desirable characteristics of the different parts of the various animals. These are put together as a composite and thus form a concept, not of what an animal is, but what it ought to be. This concept is a real thing. It can be reproduced at will and thus becomes the standard against which any animal may be compared. It is extremely important that this concept be a correct one. The principal differences in the competence of judges is in the validity of their concept of what an animal of a given breed, age, or sex ought to be.

Judging Demands Accurate Observation

The first characteristic of a good judge is accurate observation Two people seldom see the same animal precisely alike, and they do not place the same interpretation upon what they do see Gipsy Smith, the great evangelist once said ' The eye sees what the eye has means of seeing ' The eye, therefore, in order to improve its means of seeing must have a certain amount of cultivation, of training This is acquired gradually and with a great deal of personal effort The student must, therefore, take the view that he will attempt to see precisely what his instructor observes in the animal Furthermore, no instructor has any right to expect his students, at this stage, to become better judges than he is At best, he can merely expect them to do what he would do under the same set of circumstances

Develop a System for Examining an Animal

It is the entire animal that must be observed and evaluated in judging, not simply one part of it Furthermore, the time available for the observation of any one animal is usually limited Not only is it imperative that the animal be completely and correctly analyzed in a short space of time, but its strengths and weaknesses must be accurately and quickly evaluated All these evaluations cannot be accomplished with assurance unless some system is used in making observations

Since most animals have fewer faults than desirable qualities, it is well to school one s self to observe defects Furthermore, animals are rated on important or major defects rather than unimportant details The inexperienced observer tends to overrate the importance or significance of minor defects and underestimate the consequences of serious weaknesses

Animals are largely bilaterally symmetrical, that is, one side is the counterpart of the other Defects often affect one side only, therefore, it is necessary to view both sides of the animal before a decision is made Likewise, the animal should be observed from directly in front and also from the rear

Experienced judges prefer to examine animals at considerable distance often 20 to 30 feet By this procedure and at this distance, proportionality and general appearance are more effectively and accurately evaluated Major defects can be readily seen at a

Fig 2.1 A class of students judging a group of Holstein cows At this first session these students are making a very common mistake of getting too near the animals The instructor at the right is moving in to correct this condition

distance. Furthermore, it is much easier and more satisfactory to compare two animals if they are in the same field of vision at the same time. It is only when palpating (examining by touch) an udder or inspecting a defect or part at close range that it is necessary to approach an animal while judging.

Estimating the Degree or Importance of a Defect and Balancing Strengths and Weaknesses

Most of the more successful cattle breeders will recognize the existence of a defect in a particular animal They will thus agree that the defect is present. If there is any lack of agreement among them, it will be based upon the weight, significance, or importance that each places upon the defect. This is in fact the essence of judging. In the next few chapters, a zealous attempt will be made to discuss and analyze the characteristics of a good dairy cow. To provide contrasts, defects will also be described and pictured to afford comparisons between desirable and undesirable characters.

Not only is it essential in choosing between animals to be able to evaluate the significance that should be assigned to a particular defect, but even more important is the ability to balance the strengths and weaknesses of one animal against those of another. One does not frequently find two animals that have precisely the same defects. Certainly, in such cases they would not possess them to exactly the same degree. An animal thus possesses a combination of strengths and weaknesses and this body or group of char-

acteristics is evaluated together In this way an estimate is made of the quality, value, or worth of the individual This estimate is then compared either with a similar estimate made of another animal or with the mental concept one has of what such an animal ought to be

Encourage the Development of a Photographic Memory

Every person has latent possibilities in this area of development Because of their newness and our lack of knowledge of them, we marvel at the potentialities of automatic computers and especially at the memory qualities of the so called "electronic brain" Even the largest of these digital computers, those that are so big that they occupy a space equal to a large room do not compare in complexity or ability to the human mind The ability to rationalize from its storehouse of facts is a priceless asset of the human brain In putting the mind to work in judging the memory quality is extremely important

In judging dairy cattle these four steps will be an aid to memory (1) impression (2) retention, (3) recognition, and (4) recall The first impression that is made when an animal or group of animals is viewed for the first time is lasting and if carefully made, can be of great consequence In this it is necessary to school the mind to sharpen and broaden the image Let us take a simple example When we first begin to read, we spell out the letters and then form short common words Very soon we add more and longer words to our vocabulary Then we train ourselves to include two or three words together Finally, if we are proficient readers, we view an entire line or a sentence, and the most competent may even include and comprehend the meaning of a paragraph or even an entire page in one brief look. The basic process, namely, reading characteristics is the same whether appraising an animal or judging a ring of animals The first impression should create a mental image so sharp accurate and complete that it possesses the elements of a photograph This stage in proficiency is, of course, possible only after a basic concept of an animal has been fully developed and the senses have been educated to achieve this goal

An image gains value and becomes useful only when it is retained Therefore, try to overlearn those things that are worthy of retention Regard them as important, and form the habit of wanting to retain them for a long time

Recognition of important items, significant strengths or weak

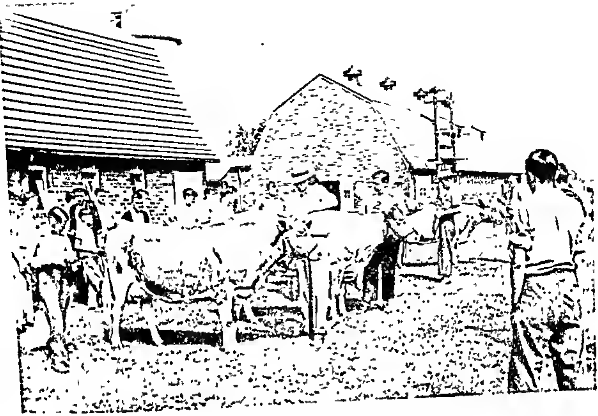


Fig. 2.2 These are 4-H Club members engaged in judging a ring of Guernsey cows at the Annual State Dairy Cattle Judging Contest. Seven other similar groups (not in view) were judging other breeds and classes at the same time. This contest would have been improved if the students had been allowed more room in which to work the ring.

nesses in an animal in contrast to the trivial, is a part of the judging discipline. There is no value in retaining an impression or an idea that is not worth recognition.

The goal of memory is recall. Try to recall impressions or images of animals frequently. Visualize the animal in the setting in which it was first observed. Should it be a ring of animals, recall them just as they stood before you. If you can close your eyes and visualize a ring or an animal just as it appeared to you, if you can repeat the recall of that image at will, you have achieved a great deal toward reaching your goal of becoming a competent judge—or an outstanding breeder.

Building Confidence and Improving Competence

Individuals differ greatly in the attitude with which they approach any responsibility. The cocksure person seldom makes a competent judge. His weakness is that he secures a small amount

of knowledge, forms an opinion too quickly, and then defends it, not realizing that it is far better to obtain more evidence in an effort to find the truth There is no criticism for defending an opinion or an idea if it is the truth The error is made when a person tries to establish and argue for an invalid opinion or idea Real confidence, not ego, is developed slowly, and only after repeated observations and experiences confirm a point of view. A conscientious and humble person will know when he is prepared and competent to judge, and those with whom he works will also at that time recognize and accept his judgment

Exchange Ideas with Competent Breeders and Judges

We learn the truth about something only after we ask and answer pertinent questions concerning it The best environment for learning about dairy cows is where good cow men and good cows are found That is usually in barns, attendance at sales, and at our major dairy cattle shows Attend events of this character as frequently as possible, and you will certainly gain knowledge and become more sagacious in its use

Study Outstanding Animals

Make it a point to study in detail the characteristics of outstanding animals, especially mature cows Observe the physical qualities of high producing durable cows that have produced well for lactation after lactation What do they possess in common? How are they put together? How has the mammary system, especially udder, withstood the hazards of years of heavy milk production? What do the head and muzzle look like? How deep is the body, and how well sprung is the ribbing? Does the appearance of the cow seem in harmony with the job she has done? Answer these questions, and you will learn a great deal about cows, and thus you will in time acquire the technique of judging

chapter **3**

Type and yield are compatible co-partners

Unwisely, there has come into the thinking of some people the concept that type and yield are contradictory qualities in a dairy cow. Some seem to have acquired the idea also that animals that possess good individuality and eye appeal are not honest at the pail. Thus they leave the impression that good producers are inclined to be rough, with prominent and easily visible bony structures that conspicuously show the depleting effect of heavy yield. These are not necessarily valid conclusions. A few animals that have had success in the show ring, especially bulls, but have failed as capable producers or as sires may have provided some basis for this view; at least they are cited as arguments to prove the contention.

Those breeders, however, who have been most successful with dairy cattle and those who work closely with them tend to hold a somewhat different view. They know that good type is not just superficial conformation or smooth lines, but penetrates much deeper into the structure of the cow and is definitely associated with the right kind of cow. The kind that produces efficiently, endures herd hazards well and reproduces her qualities consistently. Such cows are always in great demand.

Yield is easily measured in terms of pounds of milk or fat produced over any given unit of time. Everyone is familiar with this method of measurement, and recognizes that it provides a valid and accepted basis for recording production. But type is different. Not many people have a clear concept of what type in dairy cattle is, and even fewer have any basis for rating it. It is not common for two people to have precisely the same ideas about type. It should be added, however, that competent observers will agree very closely on the existence of conformational differences that affect type, even though they may differ somewhat upon the emphasis or importance that should be attached to such differences.

It is no reflection upon the existence of type or on its importance in the breeding and traffic of dairy cattle that agreement may not be perfect in the rating of it. For there is equal divergency in the opinions of people about the merits of a car, a piece of furniture, an art object, or the qualities of a person. Trained observers, however, with known competence in their particular field do tend to inspire public confidence in their judgment. A diamond merchant can, for example, estimate the value of a particular stone with a high degree of accuracy. An art critic can place a correct appraisal upon a valuable painting. Similarly, a competent judge can estimate the type, soundness, and value of an animal with a relatively high degree of accuracy.

Type Is a Concept

Suppose we ask ourselves these questions about type: (1) What is type or breed type? (2) Why is type desirable in a dairy animal? (3) What specifically are the components of type? (4) Who is responsible for establishing the concept of desirable type? (5) How much does good type influence the value of an animal?

Type has never been a clearly defined word among dairy cattle breeders. An approved dictionary defines the word broadly as "the general character, form, or structure common to a number of individuals which distinguishes them as a class." This definition is adequate for distinguishing beef type from dairy type in a cow, or Jersey type from Holstein type—or even meat type from lard type in a breed of hogs. It lacks the specificity, however, to satisfy the more inquiring breeder concerning the intimate type differences that occur within a breed.

Type lacks any readily measurable dimensional quality. It cannot be recorded in pounds, or feet, or degrees, or even in percent

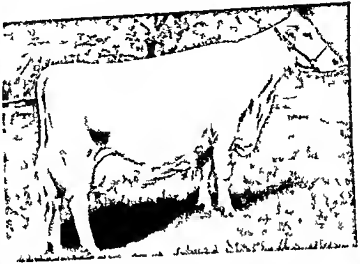
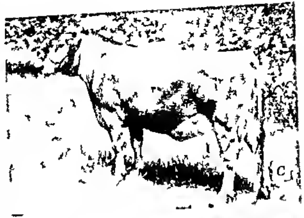
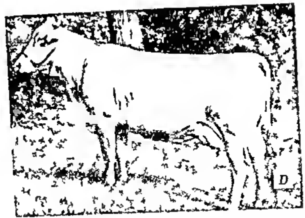


Fig 3 1 Jane of Vernon shown with four of her six daughters comb nes type production ond reproduc t on as well as ony cow of the Brown Swiss or in foct of any breed She wos classified excellent She has four excellent doughters and two excellent sons She hos two records in excess of 1000 lb fot ond produced over 100 000 lb milk in six loctotions Two oddit onol doughters not shown here





Daughter A Jane of Vernan 2nd Classified excellent produced 21 206 lb milk ond 967 lb butterfot

Daughter B Jane of Vernan 3rd Not offic olly roted for type pro duct an record 19 541 lb m lk ond 892 lb butterfot

Doughter C Jone of Vernon 4th Classified excellent Production 20 224 lb milk ond 902 lb butterfot

Doughter D Jone of Vernon 5th Classified excellent Production 16 930 lb milk and 801 lb butterfot ot 4 yeors 2 months of oge

age except by estimate or assigned unit values. It therefore exists primarily as a concept based upon a number of different qualities, most of them physical. Type has become more meaningful in dairy cattle since the advent of the herd classification program which was first introduced in the Holstein breed in 1929. This program is thoroughly discussed in Chapter 24. In the program several (6) rather broad classes were set up to differentiate the most acceptable from the most undesirable type of animals. Evaluations were made on a physical or conformational basis, and classes were identified by symbols. Numerical values were often assigned to each class, thus enabling statistical treatment of the findings.

For this project, breed associations chose several well-known and highly competent judges to rate animals for type. These men have acquired, through years of experience, well-established concepts of type, but, to insure even more uniformity in their rating of animals, they were required by their breed associations to attend schools in which all rated the same animals and compared their ratings. Problem cases were also studied, and decisions on their proper ratings were made. By this method, the type of an animal that should be included in each class was quite well standardized, and the type concept of all classifiers of a breed made more alike.

When in the field classifying animals, each classifier conscientiously applied his concept of type to all of the eligible animals in the herd. Thus the type concept of the classifier formulated to a considerable degree the type concept of the breeder for whom he classified. Type concepts were also developed in the minds of breeders, and it may be added quite effectively, by the behavior of cows themselves Breeders found that cows with certain physical qualities yielded higher, lasted longer, and withstood the hazards of herd existence better than their less well-endowed stable mates. This soundness and sturdiness, when accompanied by certain common physical characteristics, enabled breeders to look with greater favor upon the cows possessing such physical qualities. These physical qualities were then included in the breeders' concept of desirable type.

There Is a Small Positive Correlation between Type and Yield

In Chapter 1, reference was made to the positive correlation, reported by some early workers, between certain anatomical measurements and milk yield. More recently, with the advent and extensive use of herd classification, the relation between type and yield has

been further explored. A summary of some of the more recent studies in three different breeds of dairy cattle is presented in Table 3.1.

TABLE 3.1. Correlation between Type and Milk and Fat Production*

Research of	Date Reported	Breed	Correlation between Type and Milk	Fat
Tyler & Hyatt	1948	Ayrshire		0.16
Harvey & Lush	1952	Jersey		0.14
Rennie	1951	Jersey†		0.13
Tabler & Touchberry	1955	Jersey	0.08	0.11
Freeman & Dunbar	1955	Ayrshire		0.08
Tyler, Corley & Heizer	1955	Holstein	0.16	0.18
Stone, Rennie & Raithby	1955	Holstein†	0.25	0.19

* From June 1956 report of Type Committee to American Dairy Science Association.
† Canadian research

This table shows the degree to which type would influence production, or correspondingly how production would be expected to affect type, when both are viewcd from an intraherd point of view. Exprcssed in another way, if production is inereased 100 per cent, type because of its relation to production should be improved by perhaps 15 per cent. Likewise, if type is improved by 100 per cent, production would be expected to increase 15 per cent.

If eonsidered from a mathematieal or biological view point, the correlations between type and produetion that are shown above are relatively low. This view is taken beeause, as you raise one value or charaeter, you exert a rather minor influenee upon the other or seeond trait. Even though this is true, it should not be interpreted to imply that, over a long period involving many generations, improvement in one trait would not enhanee to an appreeiable degree the seeond trait. Rather it should be interpreted to mean that probably more progress eould be made in the seeond trait if both qualities were seleeted for separately but at the same time. For in this way about five times as much progress would be made in the second trait as would be aehieved if seleetion or improvement were eonfined simply to the first character.

Heritability of Type

Type, as measured by type ratings, is inherited to about the same degree as production. In support of this view, we have the

results of several studies that have been made which indicate the degree to which type is heritable Table 3.2 shows the heritability of type ratings.

TABLE 3 2 Heritability of Type*

Research of	Date Reported	Breed	No of Daughter-Dam Pairs	Estimated Heritability, Final Type
Tyler & Hyatt	1948	Ayrshire	1601	0 30
Freeman & Dunbar	1955	Ayrshire	1184	0 31
Harvey & Lush	1952	Jersey	2786	0 14
Rennie	1951	Jersey†	858	0 16
Tabler & Touchberry	1955	Jersey	2146	0.25
Stone, Rennie, & Raithby	1955	Holstein†	1037	0 21

* This table compiled from reports of six different research studies with dairy cattle Results agree quite closely with similar studies made on the heritability of milk and butterfat production

† Canadian research

In every study reported, type is shown to be a heritable quality. The degree of heritability found in the different studies varies from 14 to 31 per cent. It is quite probable that the true value for heritability of type would be slightly above 0.20. It should be recognized, however, that type ratings are estimates, and that true type values are difficult to assay.

This problem of type inheritance may also be approached from another point of view: namely, the influence exerted by a parent upon its offspring. Data dealing with this point are presented in Table 3 3 In this study sires are arranged according to their highest classification rating. Average values are then assigned for each rating Dams are also listed according to the highest rating, and the average classification of each group is recorded. The daughters produced by those matings are listed in two ways: (1) The estimated rating based on the assumption that type is 0.3 heritable, and (2) the actual type rating given the animal. The estimated rating is obtained by the formula·

$$\text{Expected daughter average} = \text{breed average}$$

$$+0.3\left[\frac{(\text{sire's type} - \text{breed average of sire}) + (\text{dam's type} - \text{breed average of dam})}{2}\right]$$

In the Tyler study, the actual classification of the daughters showed a tendency to follow tbe expected rating. In other words,

TABLE 3.3. Sire's Influence on Type of Daughters

Sire s Rating	Value Assigned to	Dam's Average Rating	Offspring Expected Rating	Offspring Actual Rating*	Daughter s Average Rating—Copeland†
Excellent	92 5	85 2	85 1	84 6	84 5
Very good	87 5	84 5	84 2	84 0	83 5
Good plus	82 5	85 0	83 5	83 4	82 2
Good	77 5	84 4	82 7	81 7	80 1

* W J Tyler, A Study of the Type Ratings of Daughters of Sires and Dams That Have Been Classified for Type, *J Dairy Sci*, **33** 375, 1950 This study involved 2005 daughters sired by 189 sires classified for type, all of the Ayrshire breed

† Lynn Copeland, The Relationship between Type and Production, *J Dairy Sci*, 24 297, 1941 This study involved 124 Jersey sires each with 10 or more officially classified daughters

the sire's influence on the type of his daughters was appreciable (resembling 0.3), and indicated that type is heritable.

In the Copeland study, reported in the last column of the table, the dam's classification ratings were not given It is probable that the more highly rated sires were mated to the better-type cows, and the lower-rated sires to the poorer-type cows, which would tend to bias the results. The correlation between the sire's rating and the daughter's classification was 0.39 ± 0.05, which, although because of the bias is perhaps a trifle high, does indicate that type is heritable.

Components of Type

When classification programs were first introduced, to rate animals for type, a single rating on the entire animal was the only rating given. Subsequently, it was shown that a single rating did not identify the strengths and weaknesses of an animal in sufficient detail. Accordingly, the different parts of an animal were rated separately by using the same symbols as those used for the complete or over-all classifications. Since the goodness or badness of these parts determines the true rating of the animal as a whole, they are in fact the components of type. The influence that each component has upon the final rating of the animal is indicated in Table 3.4.

In this study, 12,889 cows in 1730 herds and sired by 3638 different sires, all classified by the Holstein-Friesian Association of Canada in 1954, were included. The table shows the correlation between each component listed and the final classification rating.

TABLE 3 4 Components of Type*

General appearance	0 82
Da ry character	0 50
Body capacity	0 33
Mammary system	0 79
Fore udder	0 66
Rear udder	0 65
Legs and feet	0 44
Rump	0 50

* J C Rennie and G E Raithby An Analysis of the Components of Type of Hol stein Friesian Cows in Canada *J Dairy Sci* 38 617 1955

The highest relationships are between general appearance (0 84), mammary system (0 79), and the final rating, indicating that these two components are very important in determining the type of the animal. Comparatively, body capacity (0 33) and legs and feet (0 44) are less important in determining the final rating

Type Has Little if any Negative Influence upon Yield

In all the serious studies that have been made upon type and yield, few have shown that type has any negative influence upon production To put it another way, research has not shown that, as type is improved, production is lowered Type or body conforma tion in a breeding and improvement program may, therefore, be regarded independently of production. Its value in improving eye appeal and in increasing the value of an animal can thus be con sidered on merit

Type and Eye Appeal Associated with Creative Impulse

The creative instinct is strong in man Its value in cattle im provement should not be underestimated. From a human point of view, the dairy industry is at best fatiguing and confining People do not choose to become dairymen without strong incentive The prospect of financial reward, and a higher degree of security than in grain farming provide some incentive but seldom inspires im portant advances in animal production.

The great improvement that has been made in both the type and production of dairy cattle has been the result of an abiding desire on the part of someone to produce an animal superior to those that have existed before The creative impulse is a strong motivating

agent. The desire to own an animal that is superior to others of its kind, one that is highly regarded and wanted by many, inspires achievement. To create such an animal, or breed an outstanding herd, has been the lifelong ambition that has held many to the task of breeding cattle.

Heritobility of and Correlation between Body Parts

Recent studies made in Sweden have been reported by I. Johansson.[1] In his study of some several hundred head of Swedish Red and White cattle and Swedish Friesian cattle he reported the following:

1. That the development of the two front quarters in relation to the hind quarters of the udder is "strongly" determined by heredity. His estimate of heritability is 0.76 ± 0.12.
2. That the shape and slope of rump as well as the length of teats are also highly heritable ($h^2 = 0.6 \pm 0.1$).
3. That there is a significant correlation between slope of rump and slope of udder, between length of rump and length of udder, and between width of hips and width of udder.

Johansson points out that the correlation between the pelvis or rump structure and the udder is hardly strong enough to be highly important in breeding or selecting cattle but that it does support the breeder's view that such relationship exists.

[1] I. Johansson, Untersuchugen über die Variation in der Euter-und Strichform der Kuhe, *Z. Tierzücht. Züchtungsbiol.*, **70**: Heft 3, 233–270, 1957.

chapter **4**

Effect of lactation and other influences on dairy form

This general subject is usually introduced by the question Is the inherited ability to produce milk responsible for the dairy appear ance of a cow, or has her dairy form been developed by the exer-cise of the milk producing function? A discussion of the evidence supporting both views provides an interesting background to the problems of dairy cattle judging

When a healthy, vigorous cow is dry, for example, and is well fed at the time, she tends to take on considerable flesh If she is dry for a long period, as some cows are, owing to a breeding failure, she becomes thickly covered with fat, patchy about the pinbones, heavy at the withers, thick through the thighs, and develops many of the characteristics associated with a beef animal A cow may show all of these nondairy qualities and still may have been a high yielding dairy cow, and may again after calving attain high milk and fat production

Likewise, if glandular deficiencies or disease occurs, or if first con ception fails to take place at the proper time, again the animal may take on many of the characteristics of the beef form Likewise, if the animal is abnormal in sex as the freemartin* or the intersex,†

* A freemartin is a sterile heifer born twin with a bull. It is true sterility that charac terizes her as a freemartin In approximately 9% of such twin births the heifer is

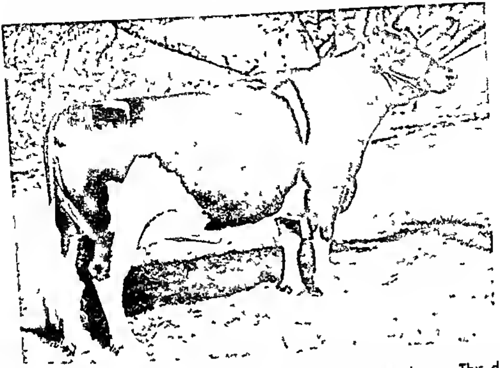


Fig 4 1 A dry cow poses a problem in estimating lactation drive This dry cow, Osborndale Lucasta Fobes, appears to lack dairy tendency, yet she has two records that average above 800 lb fat Although in high condition, she is still smooth and shows good evidence of mammary development Both are clues to her productive capacity

though apparently normal when quite young, as the animal matures, it takes on both a masculine and a beef form.

Furthermore, as a high-producing dairy cow advances in lactation and her milk flow materially reduces, she tends to gain weight and, if heavily fed, may become quite beefy in appearance. Any or all of these facts support the view that the actual performance of lactation is largely responsible for the dairy form of the animal. At least when she is not producing she loses the pronounced dairy-like appearance.

As we introduce the genetic, or inheritance, aspects of the problem, we may gain a somewhat different view. The beef animal selected for many generations for the beef-producing function, and carrying the genes to produce it, has developed a particular form or type. Even when deprived of adequate feed, the characteristic

normally fertile It is only when the two animals (bull and heifer) have a common embryonic circulation (91% of the cases) that the heifer is sterile The bull in all cases is normally fertile

† An intersex is an individual intermediate in sexual characteristics between a typical male and a typical female Such animals, whether male or female in appearance, are sexually incomplete and not capable of reproduction

beef form though not quite so pronounced is still easily recognizable in the animal. Similarly, the dairy cow selected and developed for a high level of milk production has come to have a particular and characteristic dairy form. If the beef animal through heredity takes on a more dairy-like form, or the dairy cow tends to inherit the beef form, then neither is as efficient in its respective area as it ought to be. Thus we note that dairy form is the result of both the genetic influence and the actual function of milk production. Furthermore, this interaction effect on the animal is most readily observed when the genetically competent dairy cow is in heavy flow of milk. After a cow has calved and started a new lactation and has milked for a few weeks, she usually shows her dairy qualities to the best advantage. It is then that she displays the most capacious udder, the best veination, the most dairy quality, and may have her highest value.

The ability of the cow to utilize feed for milk production when in heavy lactation and then store nutrients, especially body fat, when producing less or when dry is a great asset to the cow. It actually enables her to produce more in a lactation and also to keep in better physical condition.

A Good Judge Takes Physical Condition into Account

In judging, these alternate or interaction effects pose certain problems which need to be resolved. They can be, if we accept realistic conditions and make certain assumptions. A dairy cow in the normal course of gestation and lactation must go through certain physical and physiological stages. These are normal, they are expected, and they should be accepted. The judging or classification problem enters when we attempt to evaluate one stage without having had the benefit of seeing the animal in the other stages. It is at this point that we need to make two assumptions. The first is that, on the average, we overestimate an animal that is in relatively high condition usually a few days before calving. The second is that the roughness and lack of capacity noted when an animal is thin in flesh are usually overrated. In short, we consider a thin, heavy milking cow less capable than she is; we thus underrate her.

The best animals are the ones that give a favorable impression at all stages of their lactation. Even these tend to look somewhat better at certain stages of lactation than they do at others.

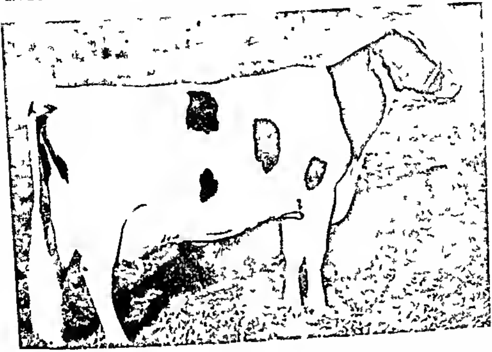


Fig 4 2 Gives every evidence of production capacity Lactation drive in cows of this type and in this stage of lactation is clearly evident This cow has a record of 33,198 lb milk and 1487 lb butterfat 3X at 13 years of age Note the longevity and excellent condition of this cow.

Gestation and Tissue Storage

It is practically impossible for a high-producing dairy cow to gain in weight when she is producing at her maximum level. More often such a cow loses considerable weight for the first 80 to 120 days of her lactation. The taking on of weight when in advanced lactation and loosing weight in early lactation materially changes the form, dairy appearance, weight, apparent capacity, and eye appeal of the average milking animal.

In a classification study conducted at West Virginia,[1] 63 milking animals were classified 137 different times after calving and before the fourth month of lactation. The same animals were classified 173 different times after the tenth month of lactation and before subsequent calving. The results indicate that the classification ratings were higher when the cows were classified soon after calving than they were even during mid-lactation (between the fourth and tenth months of lactation). The lowest classification ratings were obtained when the cows were in late lactation or dry.

[1] George Hyatt Jr and W J Tyler, Variations in Type Ratings of Individual Ayrshire Cows, *J Dairy Sci*, 31 71, 1948

Generally speaking, the thin or sometimes emaciated animal when in heavy production is, by comparison with her less capable but well conditioned stable mates, underestimated In short, she is a better animal than she appears to be In contrast, the well-fleshed, smooth individual soon after calving is often overestimated She is not as good an animal as the average dairyman rates her These are points to be remembered when judging, classifying, or selecting animals A knowledge of these points is always an asset to the foresighted purchaser

Lactation Drive Related to Form and Form Changes

It was, I believe, the late Samuel Brody, professor at the University of Missouri, who first used the term "lactation drive" Before the coming of the term, this inherent urge in the cow to utilize a large proportion of the feed which she consumed, while lactating, for milk production had been referred to as dairy temperament, dairy tendency, milky looking, milkiness, or simply dairy quality If we require a definition for lactation drive it would be "That inherent character or combination of characters in the dairy cow which enable her to utilize nutrients for milk production even to the degree that she will if necessary withdraw them from her own tissues to provide the nutrients she puts into her milk"

Lactation drive is a highly prized quality in the cow, and the ability to transmit it is even more sought for in the dairy bull But lactation drive, in and of itself, does not guarantee satisfaction in the producing cow It must be accompanied by the capacity to utilize feed, a good mammary system, durability, reasonable longevity, and other qualities In short, the cow must exhibit a proper balance between lactation drive and all the other qualities associated with the form and function of the animal Just how these qualities are identified in the animal will be dealt with in later chapters

Lactation drive, or if you prefer the terms milkiness or dairyness, causes the form of a dairy cow to change materially from one stage of lactation to another The physiological action of this quality or character on the tissues of the animal is greater perhaps than any other influence except sickness or malnutrition and semistarvation Consequently, it is extremely important to be able to differentiate between true lactation drive and poor inheritance or management in evaluating the form and condition of a dairy cow

HORMONE INFLUENCES THAT AFFECT DAIRY FORM

Any influence that changes the normal behavior of an animal will very likely be noted in a change of form. Among such influences, that are reasonably common, are those exerted by hormones.*

Impaired fertility: Any disturbance that affects the normal function of the ovaries of a cow is very quickly noted in her behavior and in form changes. Cystic ovaries, if they persist, tend to cause the cow to have a less dairy-like appearance, induce the ligaments to relax on either side of the tail head, and may even change the appearance of the head and neck.

Sterility: If this ovarian disturbance reaches a stage indicating sterility, the form of the animal changes even more. In such cases the animal, even though originally an excellent dairy animal, becomes masculine looking, looses the quality and appearance of a dairy cow, and becomes useless in the herd. Of course, the extreme cases can be detected by the average observer, but in the early stages it requires an observing and experienced judge to detcct the symptoms.

Injested harmones and same antibiotics: Feeds containing thyroprotein can produce a loss of condition and weight, especially if nutrients are not added to the ration to compensate for the increased metabolism. Stilbesterol produces the opposite effect: namely, of increasing weight. But in dairy cattle it should be emphasized that neither practice is recommended.

Thyroprotein may increase the milk yield for an animal for a limited period, but it often causes a reduction in the body weight of the individual. Furthermore, continued feeding of it tends to slow down natural thyroid activity which is essential to the normal function of the animal. Diethyl stilbesterol which is an estrogenic substance has a tendency to terminate gestation prematurely.

Antibiotics that tend to destroy the normal rumen bacteria may cause digestive problems and affect the form of an animal. They are, therefore, more satisfactory for use in young calves where the rumen is quite small and not so important in the digestive process.

* A hormone is a specific organic product of the cells of one part (internal secretion) transported in the body fluid of the organism and producing a specific effect upon cells that are remote from its source

Freemartins and intersexes: become a judging problem only in very young animals. Earlier in this chapter we defined freemartin and intersex and cited how these abnormal conditions caused the affected animals to change form. We did not indicate that intersexes can exhibit, when quite young, the normal characteristics of either sex. In some cases, especially in young bulls, it is extremely difficult to identify the intersex condition until the animal is near serviceable age. Fortunately, this condition occurs infrequently and is not thus a serious identification problem in the industry.

Interaction between Genotype and Phenotype in the Cow

There is more correlation between the genotype and phenotype in the cow than there is in the dairy bull. Since the bull does not yield milk, he does not need to look as much like a dairy animal as the cow. The phenotype (general appearance) of a bull may indicate that he is thick set, heavy in the thighs, and beefy looking, whereas his daughters expressing his genotype may be very dairy-like.

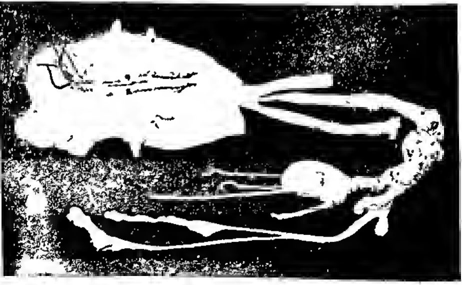


Fig. 4.3 This photograph shows the rudimentary reproductive system of a dairy animal that possessed many of the characteristics of a normal male. Note the vestigial female reproductive organs. The tissue in the ovarian position is testicular, thus accounts for the male secondary sexual characters of the animal. Observe also the rudimentary mammae located well forward of their normal position. This intersex was easy to recognize when quite young, many are not so readily identified.

It should be mentioned and perhaps even emphasized, however, that such bulls have been selected for genotype and have come from cow families that possessed highly desirable dairy qualities. Furthermore, such thick-set bulls are more likely to transmit beefy-looking qualities to their progeny, especially their sons, than would dairy-like looking bulls similarly selected for genotype.

What we are saying here is that there is a very definite interaction between the function of milk production in the cow and what she looks like. Good dairy cows seldom deceive a good dairy cattle judge even when dry. But good cows when in heavy flow of milk are not likely to deceive anybody, for they look the part.

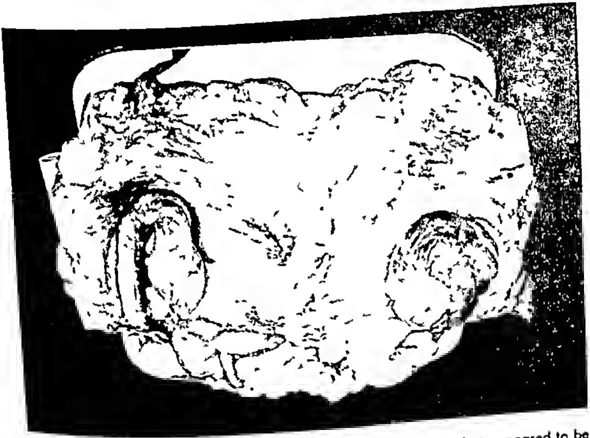


Fig 4 4 This picture portrays the condition found in an intersex that appeared to be a female When two years old, this animal was slaughtered. After the udder was removed, two well developed areas of testicular tissue were discovered An attempt had previously been made to bring this animal into lactation by injections of progesterone and diethylstilbesterol The results were negative

chapter **5**

Bone structure and parts identification in the cow

If we have a desire to become competent judges of dairy cattle especially on a functional basis, we should learn a great deal about their anatomy Bone structure is important because the quality and nature of bone the structure and form of the skeleton, and the articulation of the joints are major factors in determining both the form and durability of the animal The lines, smoothness, soundness and general usefulness of an animal depend very largely upon the kind of skeleton the muscles are attached to and the hide covers

It is true, of course, that some minor skeleton imperfections and roughness in appearance which impair the eye appeal of the animal are functionally of little importance, but certainly major weaknesses and functional failures often prove to be the deciding factor in retaining or discarding an animal To be able to make a distinction between that which is minor and that which is serious among skeletal defects is an important item in judging Equally significant, perhaps is the ability to identify the different bones or parts of the skeleton, at least those that are important in judging Lest we gain the impression that other tissues of the animal are less important than the skeleton let us proceed to study the origin and functions of the basic body tissues and organs

Basic Body Tissues and Their Functions

The body of an animal, or a person, is embryonically made up of three basic tissue structures: ectoderm, mesoderm, and endoderm. From these major tissues, the various organs and parts of the animal develop. The study of embryology and to some extent comparative anatomy, provide us with the core knowledge required in understanding the development and evaluation of the animal body.

Ectoderm is the tissue we see when we superficially examine an animal. It is the skin or body covering sometimes referred to as the epidermus (*epi* = upon, *dermus* = hide or skin). Actually the ectoderm is more than this, for it includes all the tissues originating from the ectoblasts of the embryo. In addition to the skin, we find that hair and hoofs, cornea and lens of the eye, external and internal ear, nasal cavities, salivary glands, enamel of the teeth, the entire nervous system, and certain portions of the excretory system originate from this germ layer. From the ectoderm also comes the very important organ: the mammary gland. It should be mentioned, however, that the ectoderm derivatives aside from the udder are perhaps less important in judging than the mesoderm products.

The mesoderm refers to the middle germ layer (*meso* = mid or middle) or the layer between the ectoderm and endoderm. It is derived from the mesoblasts of the embryo. The mesoderm provides the entire supporting structure of the body. In other words, the mesoderm provides the bone, cartilage, tendons, connective and adipose tissue, muscular tissue (striated, cardiac, and smooth), vascular tissue, lymph glands, blood, red bone marrow, much of the epithelium of the urogenital system, including the heart, blood, and lymphatic vessels, etc. It is a portion of the body that is of great importance to the judge of dairy cattle.

The endoderm is the intermost of the three germ layers. It is derived from the endoblasts of the embryo. From it are produced the following organs: the pharynx, thyroid, and thymus glands, the respiratory tract (larynx, trachea, and lungs), the digestive tract with its four stomachs, a part of the urinary tract, and portions of the reproductive organs.

Some persons might have concluded that up to this point too much emphasis and unnecessary detail have been used in presenting the fundamental information and facts about the anatomy of the cow. But it should be kept in mind that we are dealing with

functional judging which, as you know, penetrates beyond the mere placing of animals. For it is the type of judging that attempts to explain why certain decisions are made.

The Supporting Structure—Skeleton, Bone, and Cartilage

Bone is the densest of animal tissues. Body tissue density is obtained by applying the formula

$$D = \frac{M}{V}$$

in which D = density, M = weight in air, and V = the weight of water displaced. Bone has a specific gravity of 1.289 ± 0.013,* with a variation from 1.256 to 1.325. These values were determined by the writer on the right and left cannon bones (metacarpal) immediately after slaughter. The head, a highly bony structure, has a specific gravity of 1.073 ± 0.008. The lower specific gravity in this case is due to the cavities and sinuses that are largely filled with air. Bone is a very important supporting structure for the body of an animal. The skeleton determines the general shape of the individual, its smoothness or symmetry, and, to a considerable degree, the durability of the animal.

Figure 5.1 illustrates the position of the skeleton in a dairy cow and how the bones articulate with each other, and also provides the common name for the major skeletal portions of the body. A familiarity with the various bone structures of the body will be very helpful in explaining why certain defects in cattle are serious weaknesses, whereas others are not functionally important.

In passing it is interesting to note that more than half the weight of a cow is supported by the fore legs and feet. This fact was demonstrated in two experiments conducted at the University of Illinois. In the first of these involving 17 Holstein cows,† 52.5 per cent of the weight was supported by the front feet and legs, and 47.5

* This plus or minus value is spoken of as probable error It is a measure of the reliability of a sample Its size is determined by the deviations of the variates and the numbers studied In this case the probable error is low, and the results quite significant

† In these experiments it was found that the front and rear feet could be weighed separately, and that the sum of these two weights was approximately equal to the total weight In weighing the front and rear parts separately, it is extremely important to have the head pointing directly forward E. E Ormiston and Wilbur D Goeke made the first study, and Warren R Smith the second Results taken from unpublished data.

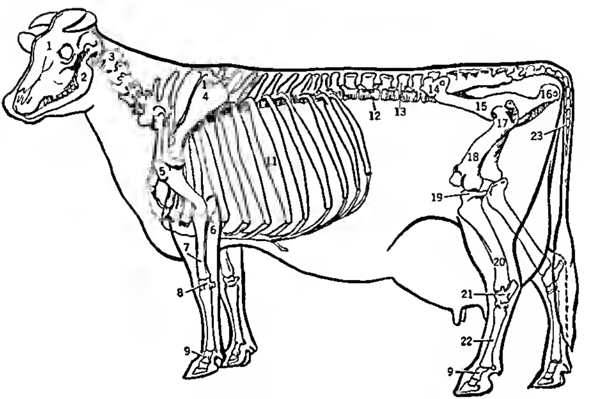


Fig 5 1 Bone structure of a cow (common usage terms)

1 Face and head
2 Jaw bone
3 Neck bones (6)
4 Scapula (shoulder blade)
5 Shoulder point
6 Elbow joint
7 Shank bone (fore leg)
8 Knee joint
9 Postern joints (front and rear)
10 Backbone wither processes
11 Ribs (13 pairs)
12 Lumbar (loin vertebrae 7)
13 Loin vertebrae short processes
14 Hook (hip) bone
15 Pelvic bone
16 Pinbone
17 Thurl joint
18 Femur (thigh bone)
19 Stifle joint
20 Shank bone (rear leg)
21 Hock joint
22 Cannon bone
23 Tail bone

per cent by the rear legs In the second with 24 cows observed including all breeds, 52.6 per cent and 47.4 per cent of the weight were supported by the front and rear legs, respectively. This difference between front and rear weight is due in part to the position of and weight of the skeleton and partly to conformation. There is also a slight effect due to pregnancy, about 0.5 of one per cent. When an animal is heavy in calf, the rear feet and legs support more of the body weight.

Relation of the Skeleton to Selection

It has been emphasized that the skeleton plays an important part in determining the form of an animal Even more important is the role of the skeleton in determining the durability or long-run usefulness of the animal. In both, it is interesting and important to

note just how and at what points the bony structure of the body is most likely to fail

Shoulder Articulation

If you will observe Figure 5 1 carefully, you will note that the fore legs and shoulder blade (scapula) do not articulate with the skeleton proper that is, with the ribs, backbone, pelvis, etc If the position of this supporting structure is to be maintained, it must be done by a less dense and less rigid structure than bone In short, the shoulder must be held in position by connective tissue, muscle, ligaments, etc If such supports fail, as they sometimes do, then the shoulder point tends to separate from the body proper

Wing shoulder is the judging term used to describe this condition It is the condition caused by the failure of the connective tissues to hold the shoulder blade firmly to the rib structure This condition can become sufficiently serious to impair the usefulness of the animal, and thereby may cause her removal from the herd It is discussed more fully in Chapter 13

Topline and Barrel Support

The straightness of back or, more inclusively, the topline of an animal is largely determined by the position and strength of the backbone (vertebral column) In order that the animal may have flexibility and mobility, this major bony structure is made up of connected segments (vertebrae) In the cow there are in all 26 vertebrae in the backbone exclusive of the pelvis and tail bone Beginning at the head, six vertebrae (neck bones) have very short, if any, processes and these extend dorsally (upward) on the back of the neck. But the next 13 segments have dorsal processes of considerable length, and no two of them are precisely alike Each of these 13 vertebrae (thoracic vertebrae) provides the upper support for a rib There are 13 pairs of ribs in all The next seven vertebrae extend from the last floating rib to the pelvis (rump) Each of these have relatively short dorsal (upper) processes but quite long lateral (side) processes on both sides These side processes support the loin and are easily visible in a very thin dairy animal

Much of the roughness or lack of symmetry and smoothness in an animal is due to irregularity in the length or height of the spinal processes extending out from the various vertebrae or to imperfections in the skeleton itself This type of roughness may not impair

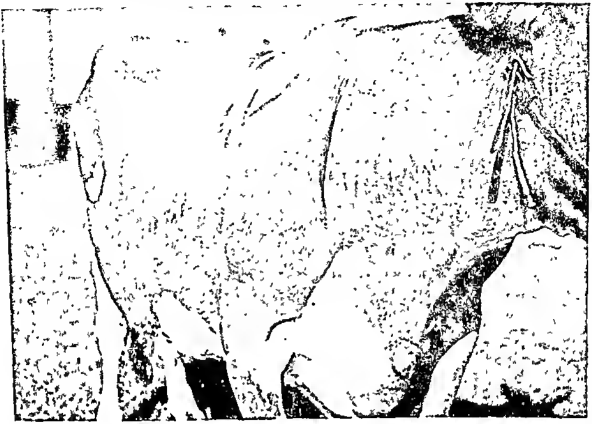


Fig. 5.2 This is an excellent example of the condition known as wing shoulder. In this cow, the shoulder point stands away from the rib structure so much that the skin is tucked in behind it.

the function of the animal, but it does reduce the eye appeal, and thus reduces the value, especially of registered or purebred animals. The degree to which such imperfections exist and their seriousness are, of course, problems for the breeder or judge to evaluate and resolve.

The Rump and Thurls

The shape of the pelvic bone, the slope from hooks to pins, and the distance between the hooks and pins are all items to consider in judging rump conformation.

If you will turn again to Figure 5.1, you will note that the hooks and pins are formed from the same bone. You will note also that the thurl joint is located slightly back of the center of the pelvic bone. Since the thigh bone is an important part of the supporting structure of the rear portion of the body, it acts as a fulcrum. If the position of the hooks is lowered, the pin is elevated to almost but not quite the same degree. This point will be referred to later in Chapter 13 when we characterize and evaluate defects.

Leg Structure and Pasterns

Probably more cows go to market because of foot and leg trouble than for any other skeletal weakness. This is not so much because cows provide their own transportation to and from pasture and while grazing, but because they stand day after day unnaturally in stanchions, on concrete floors, and on other hard surfaces. Unless the bones of the leg are firm and dense, the pasterns relatively straight, and the feet well shaped and kept that way by proper trimming, foot and leg trouble becomes a problem. Under such conditions of management, a poor quality of bone, puffy joints, weak pasterns, and widely separated toes invite leg and foot trouble.

Furthermore, crooked legs and puffy poor-quality joints are genetic skeletal weaknesses and, because of the nature of their inheritance, are difficult to eradicate from a herd.

Nutrition and Bone Structure

Inadequate nutrition not only reduces the size of an animal, a topic that is discussed in Chapter 6, but it also influences the structure of the bone and joints. Certain deficiencies in the ration, especially in young animals, may produce skeletal weaknesses that reduce the functional value of the individual. For example, an animal deprived of a proper amount of phosphorus or calcium, or unable to use these minerals properly because of a lack of vitamin D, may develop a condition known as rickets. In even a mild case of rickets, the animal usually displays signs of an arching back, stiff swollen joints, lameness, etc. In such cases, an animal, even after the deficiency is corrected, seldom becomes entirely normal. A judge should be able to identify and recognize quickly a weakness of this character.

Identification of the Parts of a Cow

One of the characteristics of a good judge or dairyman is a thorough knowledge of animals. In speaking of the characteristics of an animal, we more often refer to parts of an animal than to the individual as a whole. It is, therefore, highly important to become familiar with the names of these parts. Figure 5.3 shows a dairy cow in outline form and identifies by name the various parts of the animal. This figure should be studied until each part of the animal

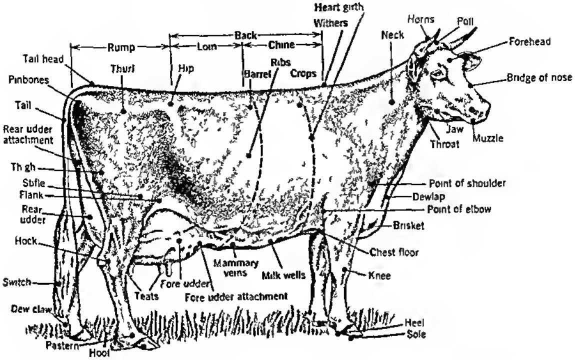


Fig S 3 Parts of a dairy cow Taken from Purebred Dairy Cattle Association Score Card, 1943.

can be easily and quickly identified. Nothing so quickly sets a real "cow man" apart from a novice as a thorough knowledge of the parts and commonly known characteristics of a dairy cow.

The Relative Importance of the Parts of a Cow

Opinions differ about the relative importance of the different parts of the dairy cow in relation to the cow as a whole. There has been some common meeting ground, however, in the interbreed score card for the dairy cow. This score card was originated and developed by the Purebred Dairy Cattle Association.* It and other standards of excellence are discussed in Chapter 7. Although a cow functions as a complete animal, it should always be remembered in judging that the failure of an important part may bring about the functional failure of the entire animal.

*The Purebred Dairy Cattle Association is composed of official representatives of the five major breeds of dairy cattle, namely, Ayrshire, Brown Swiss, Guernsey, Holstein-Friesian, and Jersey. The organization has been helpful in standardizing ideas and fostering common enterprises

chapter 6

Growth norms in dairy cows and bulls

One of the problems of judging is to evaluate size and development in an animal and expected size at a given age in the immature individual. No person can do this effectively without having some bench marks, some standards to use in providing a comparison. Breeds differ as markedly in size as in any other characteristic. But, within a breed, there are also rather wide variations in size and capacity. Even within herds we encounter considerable variation in this characteristic.

Genetic Influence upon Growth and Size

A part of the size differences both between breeds and within a breed is genetic in origin. In other words, a portion of the size difference displayed is transmitted from parents to offspring. For example, two bulls were used in the same herd at the same time and upon females of similar breeding The daughters of *A* weighed, at an average of 27 months when they first calved, 200 pounds more than the daughters of *B* at the same age. The birth-year groups were the same, and the management was essentially the same; therefore, the difference was largely due to the way in which each

group of daughters reacted to the same environment. Such a size difference under these conditions would be accounted for largely by differences in germ plasm, or, in other words, was due to inheritance.

Influence of Nutrition and Management upon Growth and Size

Just as inheritance influences size, the plane of nutrition to which animals are subjected also affects growth rate and size. Among dairy herds in general, and in the lower-yielding herds in particular, inadequate nutrition or the lack of sufficient amounts of required nutrients probably has a greater influence upon size than inheritance has. In the example referred to above, bulls *A* and *B* are actually in service in a herd. But let us now assume that bull *A* was also used in a neighboring herd in which a low plane of nutrition was followed. Let us further assume that his daughters in the second herd were 150 to 200 pounds smaller at first calving or were, in fact, only the size of *B*'s daughters in the first herd. A logical conclusion would be that this reduction in size was due mainly to a lack of adequate feed—though it should be recognized that, in addition to inheritance and nutrition, there is a third influence or an interaction effect between the two that could and probably does have some influence upon growth rate and size.

Growth Norms at Different Stages of Development

Just how large should an animal be at a given age? What are the major factors to be taken into account in answering this question? Generally speaking, the larger animals, other characteristics remaining the same, are more competent and more valuable. A number of rather significant studies confirm this observation. Among the first to show a relation between size of cow and yield was Professor Woll of the University of Wisconsin in his report of the Wisconsin competitive cow test. He concluded that, other factors remaining the same, the larger cows not only were somewhat heavier producers of milk and fat, but also were more efficient in producing each unit of product. Somewhat more recently, E. G. Misner[1] of Cornell University, in analyzing size in relation to production in dairy cows, showed that, in some 2747 cows studied, an increase of one inch in the combined measurements of width at

[1] E. G. Misner, Relation of Size of Cow to Production and Cost of Production of Milk. *Cornell Univ. Agr. Exp. Sta. Bull. 719*, 1939.

hips, length of rump, and height at hips was accompanied by an increase in yield of 429 pounds milk and 11 pounds fat. He also found that cows average or above average in size sold for somewhat more than those below average in size.

Breed Influence upon Growth and Size

Most of the judging and much of the selection are done within a breed. Therefore, breed differences are not as much of a judging problem as the size variations that occur between animals within the breed. There are, of course, several measures of size, but perhaps none are more generally descriptive than weight. Height at withers and chest circumference are also good measures of size. Both are valuable, and, when considered together with weight, provide a very good estimate of size. Students, especially those without farm experience, find it difficult to estimate the size of a heifer or cow with any degree of accuracy; therefore, growth norms should be compared with the height and weight of live animals available for observation.

Table 6.1 gives the age, height, and weight of four of the major breeds of dairy cattle.

It should be kept constantly in mind, while studying this table, that the values given are averages. Individual animals may vary above or below these values. If the weight of an animal at a given age is more than 10 per cent below the weight recorded in the table, then it may be assumed that the animal is somewhat below the accepted standard for the breed. If the animal is very thin in condition, or if a cow in milk has recently calved and depleted her body tissues by heavy milk production and is 10 or more per cent below the table weight, then the height at withers should be taken into account before that animal is considered small for her age and breed.

Figure 6.1 compares the weight of heifers of the five major dairy breeds between the ages of three months and 18 months of age.

These again are average weights and include only heifers in the University of Illinois dairy herd. They include the same birth-year groups, and all females born during a seven-year period from 1946 to 1953 are included. You will note that the weights are somewhat higher for the Missouri data than for the Illinois studies. This difference is due more to the fact that currently heifers are not kept in as high condition as they were some years ago rather than to a smaller over-all size of animal.

TABLE 6.1. Course of Growth—Dairy Females*

Age in Months	Ayrshire No.	Ayrshire Wither Height, in.	Ayrshire Weight, lb.	Guernsey No.	Guernsey Wither Height, in.	Guernsey Weight, lb.	Holstein No.	Holstein Wither Height, in.	Holstein Weight, lb.	Jersey No.	Jersey Wither Height, in.	Jersey Weight, lb.
Birth	124	27.6	72	108	26.6	65	239	29.1	90	173	25.7	53
2	123	30.2	119	86	29.8	102	237	32.3	148	159	28.9	90
4	120	34.0	198	86	33.5	173	234	36.2	243	159	32.6	158
6	119	37.2	293	86	36.9	260	231	39.7	355	167	36.2	243
8	113	39.9	389	85	39.9	350	224	42.3	462	167	39.0	324
10	112	41.7	469	85	41.7	427	213	44.4	552	163	40.9	393
12	114	43.2	538	87	43.3	490	200	46.0	632	159	42.2	450
15	108	45.1	638	85	45.0	584	185	47.9	746	143	43.9	530
18	94	46.5	725	82	46.4	663	165	49.3	845	129	45.2	601
21	92	47.6	818	78	47.3	737	150	50.6	952	123	46.2	665
24	87	48.3	902	67	48.0	818	140	51.7	1069	118	46.9	733
30	34	48.3	945	29	49.3	880	79	52.5	1120	82	47.9	824
36	28	48.7	968	29	49.9	901	75	53.0	1165	77	48.2	855
42	25	49.9	1014	28	49.9	952	64	53.2	1202	61	48.6	895
48	19	50.2	1035	25	50.4	990	48	53.3	1232	49	48.5	897
54	18	50.3	1058	21	50.5	1024	43	53.6	1271	39	48.6	952
60	20	50.4	1080	25	50.6	1055	41	53.6	1330	36	49.0	937
72	16	49.1	1132	15	49.7	1093	45	53.7	1317	38	48.4	973
84	9	48.7	1122	16	49.3	1066	27	53.7	1401	25	48.0	959

*Constructed from data of A. C. Ragsdale, *Missouri Agr. Exp Sta. Bull.* 336, 1934.

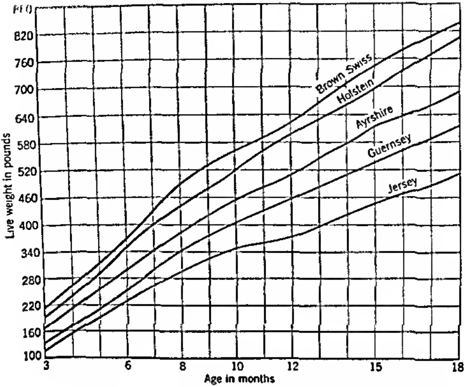


Fig 6 1 Average weight of heifers by breeds From University of Illinois data

Growth Patterns and Size in Bulls

If the animal is to be exhibited, that is another type of selection program and will be discussed in Chapter 22.

Arrested Growth, Ultimate Development, and Longevity

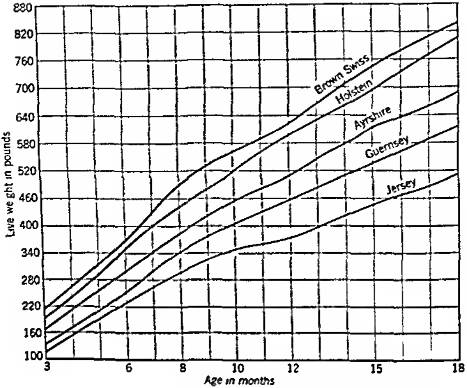
In small laboratory animals—mice, rats, guinea pigs, etc.—many experiments have been conducted to determine the effect of limited, sometimes partial starvation, diets upon longevity and reproduction. In some of these, life has been prolonged by feeding restricted diets. Longevity or durability are extremely important in selecting dairy animals to retain in a herd. It is only females with a relatively long life span that can provide adequate replacements in the herd. Furthermore, it has already been emphasized that, other factors remaining the same, the larger cows within a breed are heavier and tend to be more efficient producers of milk.

Therefore, if one selects retarded animals in order to gain longevity, will he also, because they are smaller, select less competent and less efficient producers? Experiments dealing with size and development of dairy cattle that bear upon this point are being conducted at Cornell University and Wiad, Sweden. Professor J. T. Reid[2] and others in a progress report of the Cornell work states: (1) that heifers fed a ration that was 65 per cent of the normal requirement were 79 per cent of normal weight at first-parturition (calving), (2) that, when liberally fed after calving, they gain rapidly during lactation and almost reached normal size at second calving, (3) that heifers fed 65 per cent of a normal ration showed first signs of heat at 15 months of age, whereas those fed normally first came into oestrus at 11 months of age, (4) that dystocia (difficult calving) was somewhat more prevalent in the poorly fed than in the normal group, and (5) that the yield of milk and fat for the first lactation was approximately the same for the underfed group as it was for the normally fed group.

The work in progress at Wiad, Eldtomta,[3] Sweden, is being conducted with identical twins. In this experiment, heifers fed 40 per cent of a normal ration until the second month of pregnancy and

[2] J. T. Reid, J. K. Loosi, K. L. Turk, S A Asdell, and S E Smith, Progress Report on a Study of the Effect of Plane of Nutrition upon Reproductive and Productive Performances of Holstein Cattle, *J Dairy Sci*, 40(6), Abs. p-4· 610-11, 1957.

[3] Artur Hansson and Gertrude Bonnier, Studies on Monozygous Cattle Twins, XII, Influence of Nutrition on the Rate of Body Development, *Acta Agr Scandinavica*, I 1, 1950



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Growth Patterns and Size in Bulls

At maturity, bulls in each breed of dairy cattle are much larger than the cows of that breed Bull calves are larger at birth than heifer calves, gain more rapidly in weight, and mature at an earlier age than cows Table 6 2 gives the average weight of bulls at different ages up to 18 months of age for the Jersey and Holstein-Friesian breeds Table 6 3 gives actual weight and estimated daily gains for Holstein Friesian and Jersey heifers

Genetic Size Important in Bulls

Since bulls do not function in lactation, but transmit the quality in equality with their mates (cows), the genetic size or inheritance size is more important than actual size Actual size is often largely influenced by the level of nutrition, and, unless the nutrition is so defective as to produce rickets or skeletal defects, it does not seriously or permanently impair the breeding value of the animal

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[3] Artur Hansson and Gertrude Bonnier, Studies on Monozygous Cattle Twins, XII, Influence of Nutrition on the Rate of Body Development, *Acta Agr Scandinavica*, 1 1, 1950

subsequently fed a normal ration yielded somewhat more in their first lactation than their normally fed identical-twin mates.

These and other experiments appear to indicate great recoverability in a *relatively* young animal. If growth is retarded during the normal developmental period, or during the age at which the rapid growth rate is usually displayed for that species, nature appears to extend the period. Cattle that have been retarded in early life can grow exceedingly rapidly when they are from 30 to 45 months of age, and as a result recover most of the lost development if they are given an optimum opportunity to do so.

It must be understood that in these studies we are dealing with size that is determined by environment. Genetic size, or size due to inheritance, would definitely confuse or confound the issue. Genetic size is, of course, extremely important in determining the ultimate mature size or weight, irrespective of adequacy of ration.

It should also be mentioned that these studies are in a preliminary stage—that longevity, fertility, soundness, lifetime production, eye appeal, general acceptance and value must also become a part of the solution to the problem of delayed development. Be it ever remembered, too, that any new concept or program that deviates widely from accepted and well-tested procedures should be thoroughly sampled and its value proved under different situations before it is recommended for general use.

Lactation Influence Upon Growth, First through Third Lactation

A dairy cow that has inherited a pronounced lactation drive or natural disposition to utilize feed for milk production does not grow normally during heavy lactation. Unless care in management is exercised and extra feed for growth is provided, the animal may at maturity be smaller than her genetic qualities would indicate she ought to be. In selecting for herd replacements, this lack of size and the reasons for it should be carefully evaluated. It also creates a judging and selection problem that differentiates between show-ring standards and herd-building requirements.

If such arrested development should begin early and be continued through the third lactation period, not only would the lack of actual size become a problem, but also production might.

Dentition as a Measure of Age and Growth

Occasionally, when checking the accuracy of recorded birth dates, evaluating size for a given age, or forecasting the future value of

chapter 7

Establishing standards of excellence of conformation in the dairy cow

Standards of excellence that provide a basis for the judging and evaluation of dairy cattle are the outgrowth of a considerable number of contributing agencies. But underlying all of the basic concepts that have been developed are the ideas and experiences of purebred dairy cattle breeders, research workers, and the great group of practical dairymen The expression of their concepts is to be found in various score cards, pictures, and three-dimensional models for each of the breeds, as well as superior and highly regarded animals.

Undoubtedly the best standard of excellence for the beginning judge to use is a thoroughly superior animal that he can observe and study. Better yet, of course, would be several such animals that would provide a basis for making comparisons. In the absence of such superior animals, and they are relatively rare in breeders' herds and in the herds of our agricultural colleges, it is necessary to make use of other mediums to acquaint the student with the qualities that are possessed by superior dairy animals. An analysis of these various media in an attempt to set forth their value and authenticity is pertinent to an understanding of judging standards.

Establishing Standards of Excellence for Dairy Conformation

The first significant effort to set up some sort of guide or goal for evaluating the various parts of a dairy cow was presented in the form of a score card. The idea of a standard of points seems to have been originated by one "Jereme" on the Island of Guernsey at or about 1828 Officially, however, the Royal Agricultural Society of England on January 18, 1834,[1] drew up the first scale of points for Jerseys It seems that the society selected two of the best cows on the Island of Jersey as models One of these cows was presumed to be perfect in her fore quarters and barrel, whereas the other excelled in her hind quarters A group of outstanding breeders and dealers then evolved "a scale for governing the judges at the shows" This scale of points emerged as a separate standard for the bull and another for cows and heifers Thus a century and a quarter ago the following score card for Jersey cows and heifers became the guides for judges to follow.

Scale of Points of Cow and Heifer

		Points
1	Breed on male and female sides reputed for producing rich and yellow butter	4
2	Head, small, fine, and tapering, eye, full and lively, muzzle, fine and encircled with white, horns, polished and a little crumpled, tipped with black, ears, small, of an orange color within	8
3	Back straight from the withers to the setting of the tail, chest deep and nearly of a line with the belly	4
4	Hide thin, movable, but not too loose, well covered with fine and soft hair of good color	2
5	Barrel whooped and deep, well-ribbed home, having but little space between the ribs and hips, tail fine hanging two inches below the hock	3
6	Fore legs straight and fine, thighs full and long, close together when *viewed from behind hind legs short, and bones rather fine, hoofs* small, hind legs not to cross in walking	2
7	Udder full well up behind teats large and squarely placed, being wide apart, milk veins large and swelling	4
	Perfections for cows (Since heifers are undeveloped in udder, deduct 2 points)	27
	Perfection for heifers	25

[1] John Thornton, *The English Herdbook of Jersey Cattle*, vol. 1, pp 23–24, 1879 G T Nuttall, *The Jersey Breed*, pp 19–20 J C Society of Queensland, 1938

The score card further stated: "No prizes shall be awarded to cows or heifers having less than 24 points."

Experienced dairy cattlemen will detect some resemblance between this first organized attempt at a score card to establish a standard of excellence and present views. The major difference is that our present concept deals more with function and fundamentals and less with minor details. Furthermore, the present score card is more comprehensive and indicates a more realistic approach to the major attribute of a cow: milk production.

The current dairy cow score card (Fig. 7.1) with the widest acceptance was developed and published by the Purebred Dairy Cattle Association in 1943. This score card (Interbreed Dairy Cow Score Card) also has the official approval of the American Dairy Science Association. This is a basic dairy cow score card and is applicable to each of the five major breeds of dairy cattle.

It should become evident as you study this score card that the men who formulated it for the P.D.C.A. were primarily concerned with the basic physical attributes of the superior dairy cow. This is manifest in the major divisions of the score card: namely, (1) general appearance, (2) dairy character, (3) body capacity, and (4) mammary system, all of which are intimately associated with the three most important functional qualities of an animal. These are (1) a high level of production, (2) a long, useful life span, and (3) good public acceptance.

Unless a cow possesses these three qualities, she is not likely to take an important place in any good herd. Without the first she is uneconomical, and an enterprising dairyman cannot afford to own her. Without the second she cannot leave any important genetic influence upon the herd. Without the last her blood will not have any opportunity to mingle with the most acceptable germ plasm, and her progeny will be discriminated against, and thus they will not have great value.

The Major Value of the Score Card in Judging

There is general acceptance on the part of dairy cattle breeders of the score card as the standard against which their cattle are to be judged. As an example, if two breeders disagree on the merits of an animal, one or the other is almost certain to refer to the points allowed on the score card to support his contention. In all probability, however, breeders place too much confidence in score card values in determining the quality of their animals.

DAIRY COW SCORE CARD

Ideals of type and breed characteristics must be considered in the application of the terminology of the score card

Based on Order of Observation — Perfect Score

1 GENERAL APPEARANCE — 30

Attractive individuality, revealing vigor, femininity with a harmonious blending and correlation of parts; impressive style and attractive carriage with a graceful walk.

BREED CHARACTERISTICS (see below) — 12

HEAD — medium in length, clean-cut; broad muzzle with large, open nostrils; lean, strong jaw; full, bright eyes; forehead broad between the eyes and moderately dished; bridge of nose straight; ears medium size and alertly carried.

SHOULDER BLADES set smoothly against chest wall and withers, forming neat junction with the body.

BACK strong and appearing straight with vertebrae well defined.

LOIN broad, strong and nearly level.

RUMP long, wide, top-line level from hips to and including tail head. — 10

HIPS wide, approximately level laterally with back, free from excess tissue.

THURLS wide apart.

PIN BONES wide apart and slightly lower than hips, well defined.

TAIL HEAD slightly above and neatly set between pin bones.

TAIL long and tapering with neatly balanced switch.

LEGS wide apart, squarely set, clean-cut and strong with fore legs straight.

HIND LEGS nearly perpendicular from hock to pastern. When viewed from behind, legs wide apart and nearly straight. Bone, flat and flinty, tendons well defined. Pasterns, of medium length, strong and springy. Hocks cleanly moulded. — 8

FEET short and well rounded with deep heel and level sole.

2. DAIRY CHARACTER — 20

Animation, angularity, general openness, and freedom from excess tissue, giving due regard to period of lactation.

NECK long and lean, blending smoothly into shoulders and brisket; clean-cut throat and dewlap.

WITHERS well defined and wedge-shaped with the dorsal processes of the vertebrae rising slightly above the shoulder blades. — 20

RIBS wide apart. Rib bones wide, flat and long.

FLANK deep, arched and refined.

THIGHS incurving to flat from the side; wide apart when viewed from the rear, providing sufficient room for the udder and its attachment.

SKIN of medium thickness, loose and pliable. Hair fine.

3. BODY CAPACITY — 20

Relatively large in proportion to size of animal, providing ample digestive capacity, strength and vigor. — 12

BARREL deep, strongly supported; ribs wide apart and well sprung; depth and width tending to increase toward rear of barrel.

HEART GIRTH large, resulting from long, well sprung fore ribs, wide chest floor between front legs, and fullness at the point of elbow. — 8

4 MAMMARY SYSTEM — 30

A capacious, strongly attached, well carried udder of good quality, indicating heavy production and a long period of usefulness.

UDDER—CAPACITY and SHAPE, long, wide and of moderate depth. Extending well forward, strongly attached, reasonably level floor. Rear attachment, high and wide. Quarters evenly balanced and symmetrical. — 25

TEXTURE soft, pliable and elastic. Well collapsed after milking.

TEATS uniform, of convenient length and size, cylindrical in shape, free from obstructions, well apart and squarely placed, plumb.

MAMMARY VEINS long, tortuous, prominent and branching, with numerous large wells. Veins on udder numerous and clearly defined. — 5

TOTAL — 100

AYRSHIRE CHARACTERISTICS

COLOR — Red of any shade, mahogany, brown, or these with white, or white, each color clearly defined. Distinctive red and white markings preferable. Black or brindle markings strongly objectionable.

SIZE — A mature cow in milk should weigh about 1150 lbs.

HORNS — Inclining upward, small at base, refined, medium length and tapering toward tips.

BROWN SWISS CHARACTERISTICS

Strong and vigorous. Size and ruggedness with quality desired. Extreme refinement undesirable.

COLOR — A shade of brown varying from a silver to a dark brown. Hair inside ears is a lighter color than body. Nose and tongue black with a light colored band around nose. Color markings which bar registry are: white on sides, top, head or neck and legs above knees or hocks. White on belly or lower legs objectionable.

SIZE — A mature cow in milk should weigh about 1400 lbs.

HORNS — Inclining forward and slightly up. Moderately small at base, medium length, tapering toward black tips.

GUERNSEY CHARACTERISTICS

COLOR — A shade of fawn with white markings clearly defined. Black or brindle markings objectionable. Skin should show golden yellow pigmentation. When other points are equal, a clear or buff muzzle will be favored over a smoky or black muzzle.

SIZE — A mature cow in milk should weigh about 1100 lbs.

HORNS — Inclining forward, small and yellow at base, refined, medium length and tapering toward tips.

HOLSTEIN CHARACTERISTICS

COLOR — Black and white markings clearly defined. Color markings which bar registry are: solid black, solid white, black in switch, black belly, black encircling leg touching hoof, black from hoof to knee or hock, black and white intermixed to give color other than distinct black and white.

SIZE — A mature cow in milk should weigh about 1500 lbs.

HORNS — Inclining forward, incurving, small at base, refined, medium length and tapering toward tips.

JERSEY CHARACTERISTICS

COLOR — A shade of fawn, with or without white markings.

SIZE — A mature cow in milk should weigh about 1000 lbs.

HORNS — Inclining forward, incurving, small at base, refined, medium length and tapering toward tips.

Fig 7 1 Score card developed and used by the Purebred Dairy Cattle Association

The score cards that breeders use are usually developed by an interested, competent, and experienced group or committee appointed to review the previously accepted score card and make such recommendations for change as they deem necessary or desirable. Many pictures of highly regarded animals and their parts, such as head, barrel, udder, etc., are used as each section of the score card is discussed. The resulting score card because of differences of opinions is thus the product of a series of compromises. Because of the previous and common acceptance and an unwillingness to change from the old standards, the new score card seldom deviates greatly from the original. As a consequence a score card tends to be based more upon precedent, empirical observations, and opinions than upon hard core facts that come from experiments and controlled studies.

A Score Card Has Same Teaching Value

Academically, the score card for dairy cattle has considerable value in acquainting the student with the various parts of an animal and the relative importance of each part as it relates to the animal as a whole. It has the advantage too of listing the various parts of an individual under functional relationships such as dairy tendency, feeding capacity, mammary system, etc. Then, in addition, it tends to give the beginning student a more comprehensive and inclusive separate listing of parts with their respective significance, to aid him in his judging of an animal and, lastly, especially the beginner, in stating his reasons for making a placing. After the student has utilized the score card in this way, it is better for him to rely on his own knowledge and experience than to continue to use the score card. Persons who constantly refer to the score card in judging becomes mechanical in their rating of defects, are not usually effective in appraising the relative importance of weaknesses, and are seldom acceptable judges.

A Weakness of the Addition Score Card

As has been stated above, the score card has considerable value in pointing a finger at the parts of an animal that require consideration in judging. The score card has, however, a tendency to fail, because, in pointing out the more serious weaknesses, no account is taken of the fact that weaknesses do not exist alone. Grave defects have an effect upon the entire animal, not just the part in-

volved. Thus a score card that merely adds the sums of the different factors but takes no account of the interaction between such factors is unrealistic in appraisal of an animal. In reality, it is the interaction effect of defects as well as the defects themselves that determines the acceptance or rejection of the individual. A serious single weakness such as a defective udder or bad legs and feet can cause the complete failure of the animal.

Recognition of this is possible only when the score card permits a special points adjustment—an adjustment sometimes phrased in this manner: "For an extremely serious defect, as many as 15 points may be deducted from the regular score to adjust for the interaction effect of defects."

Show-Ring Judging a Factor in Determining Type Concepts

The show ring has undoubtedly had considerable impact upon the type and physical characteristics of dairy cattle. The effect, whatever it may have been, has been accumulative, and it has covered a relatively long span of time. In Holland, England, Scotland, the Channel Islands, and Switzerland, dairy cattle shows and exhibitions have been held for upward of 100 years. For example, it was mentioned above that the score card formulated in England more than 120 years ago was to be used by judges in the awarding of prizes, indicating that shows were being held before that time. Many of our states have held fairs as long ago as 100 years. The National Dairy Show was inaugurated in 1906, the Dairy Cattle Congress in 1912, and the Eastern States Exposition in 1916. All these shows, especially the major exhibitions, have tended to shape type and conformation opinion and, perhaps more important, have constantly advanced and improved the standards of excellence of the cattle shown. Figures 7.2, 7.3, 7.4, 7.5, and 7.6 portray recent National dairy show winners and illustrate the highest ratings in dairy cow conformation.

what similar program at their annual meeting in June 1932. The other major dairy cattle breeding associations have since followed the action of the Holstein-Friesian and Jersey breed associations and now have herd classification programs of their own.

In the earlier years of herd classification, especially in the Jersey breed, classification took the form of a classification demonstration: The breeder whose herd was being classified invited his friends and fellow breeders to view the classification. In these demonstrations, the official classifier would discuss the merits and faults of each animal rated. The breeders present often checked their judgment with that of the classifier by rating the animals themselves before the official rating was given. As a result, breeders learned to recognize the qualities emphasized in classification and very quickly became much better judges of the animals in their own herds. In this manner and by the rating of the animals themselves, herd classification played an important role in establishing standards of excellence in dairy cattle.

Judging Schools and Breed Regional or Parish Shows

The various dairy cattle breed associations, usually at the state level, frequently hold type and judging schools to which are invited persons who are expected to officiate as judges at regional and parish shows held within the state. Frequently as many as 50 to 100 persons attend these schools, which are usually held at prominent breeding establishments. Experienced judges and/or breeders act as a panel to make the placings and lead the discussions. Many rings are placed and discussed. The net result is that those in attendance tend to place cattle both more competently and more like each other. These are moderately high-level meetings, and their influence is extended to the local level.

By insisting that the judges at the regional- and state-level breed shows give reasons for their placings, the shows take on an academic or educational aspect. Although cash prizes are not awarded at such shows, they are well supported by breeders and usually well attended by spectators. They play an important part in the program of breed type improvement.

Benchmarks for Standards of Excellence in Judging

Every student of dairy cattle has created for himself certain benchmarks, or standards by which he forms an opinion about an animal. He may not be conscious of how or where his concepts

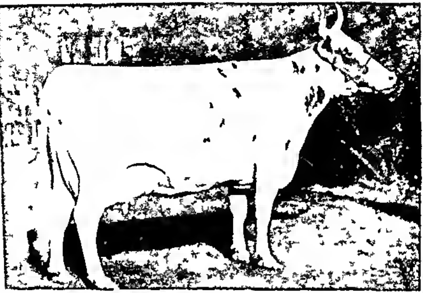


Fig 7.2 This Ayrshire cow Alfalfa Farm Ann II was grand champion cow of the National Dairy Show She represents a highly desirable combination of Ayrshire type and productive capacity

Fig 7.3 Lee's Hill Ski Lady R. was grand champion at the National Breed Show 1954 She has excellent conformation and a very superior udder She is a good cow to use in building a concept of the breed

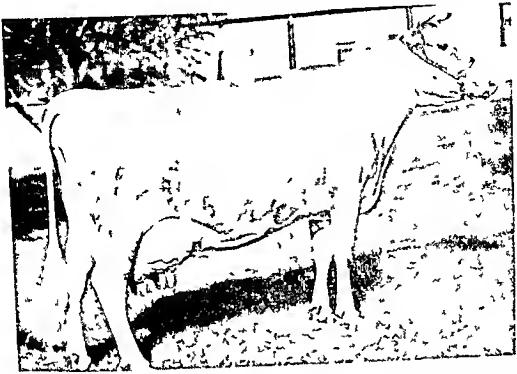


Fig 7 4 The cow Quail Roost Noble Primrose, many times a grand champion, possesses many qualities that are highly admired in the Guernsey breed She has size and power combined with good conformation and a very desirable mammary system

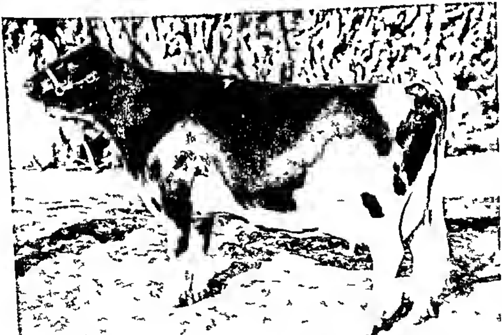


Fig 7 5 The Holstein cow Plain View Inga was undefeated grand champion cow in both the United States and Canada during 1956 She combines excellent type and high production She produced at 4 years 1001 lb of fat and at 5 years 25,942 lb of milk and 1042 lb of fat

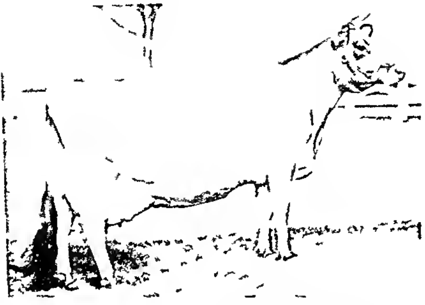


Fig 7 6 Golden Jersey Star combines excellent type good production and unusual durability Few cows of any breed can equal her show winnings over a 5 year period Grand champion at the 1956 National Jersey Show

were formulated or matured But they are his own and they are not precisely the same as those of any other person Judging then is the exercise of a personal opinion measured against the bench marks of a common judgment or group opinion

That group opinion rates a cattle breeder or judge and his judgment namely upon four basic points

1 The thoroughness of his knowledge of dairy cattle

2 His sincerity fairness and resoluteness of judgment

3 The consistency with which he follows his standards or concepts

4 Confidence in himself—yet with humility and a willingness to accept the opinions and views of others

These are the benchmarks by which a real dairy cattleman is rated

chapter **8**

Comparative judging should be made a teaching forum

Broadly speaking and from a physical standpoint, animals are usually evaluated in one of two ways. Either they are all present at once and thus compared with each other, or an individual, as in herd classification, may be compared with some standard or mental concept. The former is characterized as comparative judging and is used extensively;

1. In the major show ring, at local fairs, in parish or regional breed shows, etc.
2. In judging contests.
3. As a teaching device.
4. In buying animals, especially at public auction.
5. To some degree in culling animals from a herd.

In all these instances, one animal is compared with another, or one group with another group, as is done in the Danish system of judging. All of the animals are present together when they are evaluated.

The Show Ring a Forum for the Study of Conformation

The show ring is a long-established and well-recognized agency for comparing animals. Its successful history, continued support,

and especially its most recent development in the parish or region as a breed show attest to its popularity and worth. Its value lies primarily in these characteristics:

1. It provides an occasion for animals to be compared and rated in terms of other similar individuals.
2. It gives breeders an opportunity to compare their animals with others, and thus to determine how effectively their own herd members survive the placings of an impartial judge and the weight of public opinion.
3. It provides a forum for the exchange of ideas and encourages the formation of new opinions or concepts.
4. It is a form of advertising and directs attention to a deserving animal or a good herd.
5. In the larger shows, it extends the market for surplus stock with a relatively low selling expense.
6. For the visitors and spectators it sets standards of excellence and tends to inspire breeders to improve their own dairy cattle.

Educationally and as an agency for cattle improvement perhaps the smaller shows, particularly the parish and regional breed shows and 4-H Club shows, exert the greatest influence. In such shows the judges, are required to give the reasons for their placings, and these are usually listened to with close attention. Because of this, it is extremely important that the judge be competent and that his reasons be audible, correct, and lucid. For it is at such shows that concepts are molded and opinions formed. Persons who attend these shows return home impressed, believing what they have seen and heard.

Judging Contests Provide a Worth-While Experience

Aside from the discipline of the contest itself, the most gain to a team or a student is made during the rather long training period *preceding the contest. During this period, a capable coach who* understands his job not only improves the judging ability of his team members but also by his intimate contacts exerts a tremendous influence upon their personal development.

In the conduct of a judging contest, two items should be strongly emphasized. First, it is very important that the cattle should be of a standard of quality that makes the judging meaningful. There is very little to be gained in placing substandard animals, and the most capable judges are put at a distinct disadvantage when such

animals are presented to them. The second essential is that the animals in a ring be carefully selected as to development, age, breed, and stage of lactation. The placing should be logical and defended by well-chosen reasons. If these attributes are present then the contest should:

1. Heighten the student's ability to observe and evaluate the characteristics of an animal.
2. Enhance his concept of type, and assist him in recognizing correct conformation in a dairy animal.
3. Quicken the student's response in detecting and evaluating the good and bad points of an animal and in making prompt decisions about them.
4. Broaden his experiences in working with animals and improve his ability to explain and support his placings while under the stress of competition.
5. Extend the field of his experiences by travel and the meeting of new people under circumstances not ordinarily open to him and that otherwise would not be possible.
6. Aid the student in rationalizing more thoroughly and effectively on any set of values or experiences encountered later in his contacts with society.

Comparative Judging Used as a Teaching Device

Of the various ways in which we employ the senses to acquire knowledge, the use of sight or vision is probably for the majority of people the most effective. Comparative judging lends itself readily to visual education. A group of animals provide excellent material to illustrate and emphasize certain characteristics. It is possible, for example, to move animals before a class or, if the class is small, to go from animal to animal, thus pointing out by direct comparison obvious differences. If the animals are wisely chosen to illustrate certain points, and the differences to be emphasized are sufficient to be recognizable by an inexperienced observer, then, by this method, rapid progress can be made in teaching judging to a class.

Difficulties Encountered in Judging Comparatively

It is not always possible, even in a large university dairy herd, to find animals that possess the qualities that need to be demonstrated. If one really good animal of each breed is available to

serve as the standard of excellence and to provide a visual criterion, the basic elements of conformation can be successfully presented. Well-chosen photographs of animals and parts of animals can be extremely helpful in providing supplemental material, and even in establishing a concept of a good sound dairy animal.

The Classroom a Judging Forum

Students learn most effectively if the classroom is used as a forum. Originally the word "forum" referred to a place, a meeting place where ideas were presented, attack, and defended. More recently the word has taken on a broader meaning and refers to an exchange of ideas, an opportunity to ask and answer questions: in essence a place to learn.

An exercise in comparative judging provides an excellent medium for taking advantage of this newer forum concept. A comparative judging exercise loses so much of its academic value if it is conducted merely as a means of ranking four or more animals. If it is used only as such, the student merely places the animals, possibly writes a set of reasons for his selection, and turns in his paper. The instructor then places the ring, and the student only knows whether he did or did not agree with his instructor. Sooner or later the student learns what the instructor likes or dislikes and ultimately passes the course. But the question is: Did he or did he not really learn much about the characteristics of a dairy cow?

Suppose, on the other hand, we do use comparative judging as a forum to learn about the qualities of dairy cattle. With this approach, we consider the function of the cow, and how her physical form relates to and carries out that function. How should a dairy cow be built to perform her task? What are functional strengths and weaknesses, and how do they manifest themselves in the living animal? Are defects necessarily of the same significance or importance? What constitutes a serious functional weakness? How are *such physical defects related to the dairy function?*

With this approach, rings or groups of animals are chosen that portray certain weaknesses These animals are then studied comparatively, and their weakness evaluated as to degree. In fact, they might even be ranked according to the seriousness of the weakness. It is well, in the earlier sessions, to have an animal for comparison that does not possess the weakness In this manner, each defective animal may be directly compared with the normal one, and the seriousness of the weakness may be thoroughly discussed.

In this type of study, there is no compounding of defects, and the issue is clear-cut and specific. This same method of study and the same procedure may be followed until, one by one, the important physical characteristics of an animal have been separately considered. In this way, the student of physical form learns a great deal about defects, and how they affect the function and durability of an animal.

This prepares the student for the next major step in judging, which consists of comparing the significance of major defects. The problem at this stage is to be able to balance strengths and weaknesses, and to decide which of two weaknesses (defects) is the more serious. It is not the individual defect now that is involved in the decision. It is not even a question of deciding which animal is least affected by a defect. It has become a question of which animal, among those considered, all strengths and weaknesses being taken into account, is the most desirable. It is a problem of comparing the entire animal with other animals.

In the earlier stages of this exercise, it is extremely important to have the rings easily placeable. If a student or prospective judge evaluates such rings correctly, then he gains confidence in his ability, and is ready to begin his thorough course in judging experiences. At this stage, a proper placing of the rings is not so much of a determinant of the student's ability as are his reasons for making the decision, and given by him in support of it.

Preparing and Giving Oral and Written Reasons

One of the major weaknesses of college graduates, and the one cited more frequently by their employers than any other, is that they lack the ability to communicate their ideas effectively. Careful attention to the preparation and giving of reasons can, therefore, perform a dual and extra function: (1) It can aid in developing the student so that he can express himself more clearly, concisely, and accurately. (2) If carefully checked by his instructor, written reasons should improve a student's diction, spelling, and sentence structure in written communication.

Oral Reasons. Approximately 90 per cent of person-to-person communication is oral. It is, therefore, important in addressing a person or an audience to enunciate clearly, express ideas effectively, and create a favorable impression. If the person addressed is present, the quality of voice, as well as the appearance and attitude of the speaker, become a part of effective communication.

In any communication, ideas and their organization are important. If reasons for placing a ring are given orally, accurate statements and a logical sequence of ideas aid materially in presenting an effective set of reasons. These are suggestions on how to give an effective set of oral reasons in a judging contest:

1. Dress in clothes that are neat, look well on you, and give you a feeling of confidence.
2. Be dignified; stand erect but naturally. Establish if you can the feeling and appearance of confidence without creating the impression of arrogance or conceit.
3. Be earnest, but speak rather slowly and distinctly at first, and with more enthusiasm as you proceed with your reasons.
4. Try to phrase your statements in terms that a real cow man would understand and appreciate.
5. When preparing for a contest, learn to visualize each ring of animals so that you can recall in considerable detail the characteristics of each animal.
6. During your training period, memorize several good sets of reasons, and practice giving them before a mirror. Do this over and over again.
7. When in a contest, quickly formulate the best set of reasons you can on each required ring, and then use every minute you have available before giving that set of reasons to go over it, smooth it up, and thus be able to present it more effectively.
8. After the contest is over, relax with the feeling that you have done the very best that you could.

Written reasons. Perhaps there is no better way to deal with the problem of preparing and writing reasons than to set up a situation and deal with it. Figures 8.1 through 8 4 show three views of four different animals. These animals are identified as 1, 2, 3, and 4. They provide a ring of four mature cows. The first approach to this judging problem is to make a concise analysis of the relative strengths and weaknesses of each animal. From this analysis, a decision of the placing must be made.

In this particular ring, the analysis should bring out these strengths and weaknesses of each animal, and in turn they might be expressed in this manner.

I Cow 4 (Fig 8 4) appears to be the most desirable as well as the most competent cow in this ring because
1 She possesses excellent dairy qualities with easily the best mammary system

2. She is much superior to cows 2 and 3 in type and smoothness and excels 1 in dairy qualities and scale.
3. She has excellent balance and symmetry and has fewer defects than any other cow in the ring.

II. Cow 1 (Fig. 8.1) is my second choice because:
1. She is smoother and more capacious than either 2 or 3.
2. She is also appreciably deeper in chest and body than either *2* or *3*, especially 3.
3. She excels 3 in udder and concedes somewhat to 2 in rear udder and udder texture.
4. She concedes some, but not a great deal, to *2* in dairy qualities.

III. Cow *2* (Fig. 8.2) rates the third position by virtue of:
1. A mammary system that is larger, more level, and stronger in rear attachment than that of 3.
2. Superior quality and dairy character.
3. A more milky appearance.

IV. Cow 3 (Fig 8.3) is the least desirable cow in the ring because:
1. She Is inferior to all the other cows in mammory system.
2. She shows less general quality and dairy tendency than the other cows.
3. She is the *least desirable animal* in the ring in conformation and breed type.

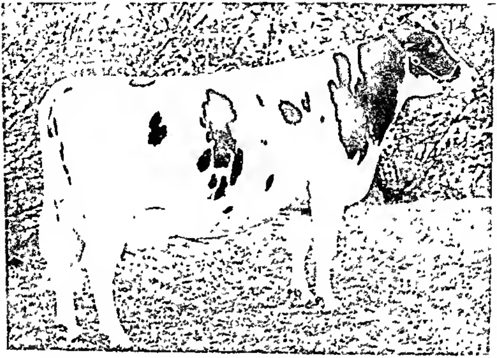
Having made this basic analysis of the differences between the cows in the ring and arrived at a placing, one's next step is to formulate a set of reasons to amplify, explain, and defend the placing. The following reasons are presented as a sample for students to use and improve upon.

A Suggested Set of Reasons for Placing This Ring

My placing of the ring is *4–1–2–3*. *Four* is preferred to *1* because she is superior in udder and veining, larger and more capacious in barrel, and excels in evidence of milkiness.

The udder of *4* is attached higher and wider in the rear, has superior texture, and distinctly more surface veins. Furthermore, her milk veins are larger, and, since her udder has greater depth and width, it excels in capacity. The cow herself is larger, with greater stretch and length of body. She has a longer, more dairy-like looking neck. She is more open *ribbed*, thinner in the thighs, broader across the rump, and possesses more over-all dairy quality and capacity. In analyzing these two cows, it should be mentioned that *1* is somewhat superior to *4* in set of legs, cleanness at the hacks, and perhaps in quality and firmness of bone. She also stands straighter on her pasterns.

One is chosen over 2 as she has more depth and capacity, is much smoother over the topline and rump, and stands straighter on her legs. She is also a broader, stronger cow than 2. One gets her superiority in capacity by being deeper and *fuller in* chest, stronger in spring of rib, especially fore rib, and by having a greater width between



Figs 8.1–8.4 Three views each of four different mature cows. Fig. 8.1

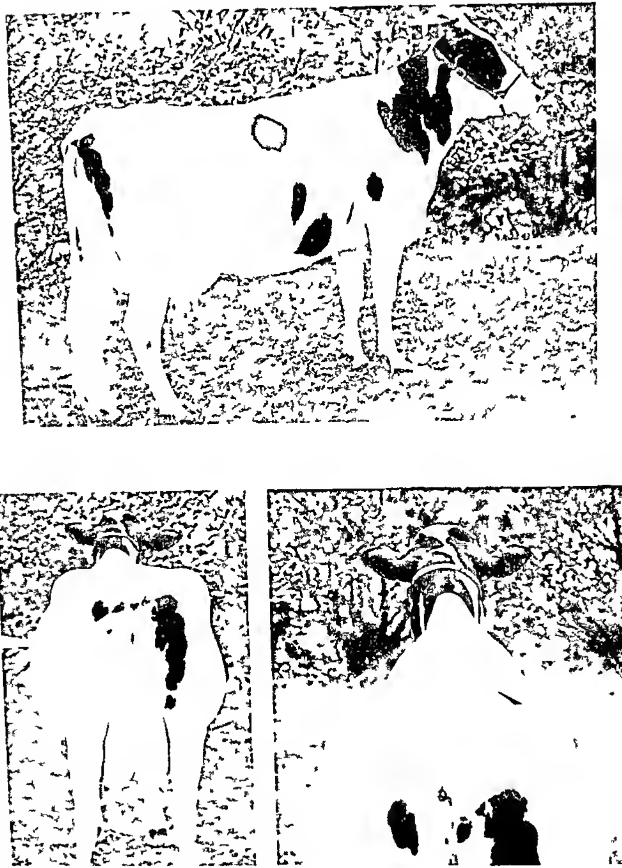


Fig 8 2

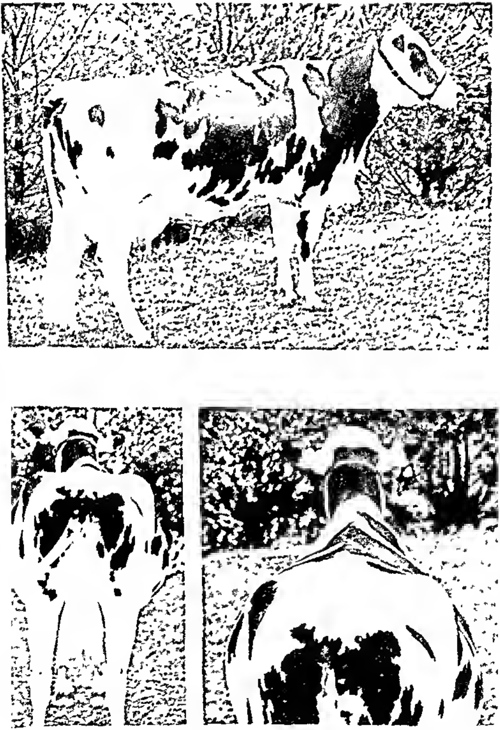


Fig. 8.3

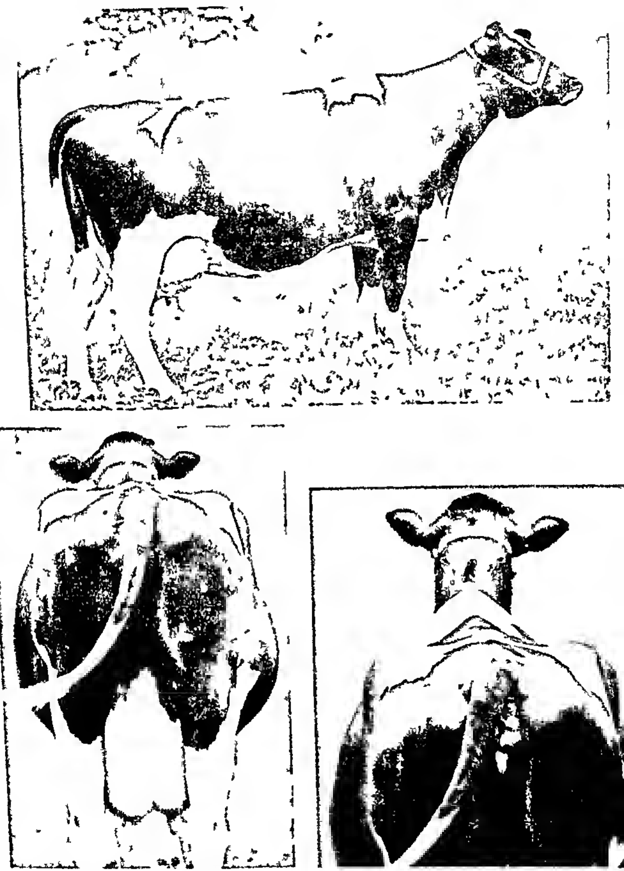


Fig 8 4

the hooks and through the thurls Furthermore, 1 is much straighter and smoother in topline more level and wider in loin, higher and wider at the pins with a flatter rump and smoother tail setting She also possesses more substance in bone and stands straighter on well set legs True, 1 is not as dairy like as 2, and 1 concedes in height and width of rear udder and in udder texture

Two surpasses 3 because she has more breed character, general quality, and style She excells also in shape and capacity of udder as well as in evidence of production The udder of 2 is larger, more shapely, with well developed fore quarters that are firmly attached She also has a broader stronger attached rear udder The network of surface veins and appearance of good texture give the udder a highly productive look Furthermore, 2 is deeper and fuller at the elbows with a superior spring of rib Her body is somewhat deeper especially in rear flank She is more alert and appears to be a stronger, more active cow

Perhaps 3 has less to commend her than any other cow in the ring Her general relative lack of quality and capacity, coupled with only a slightly better than average udder and veins places her in last position Although this cow is placed last in this ring it is not to imply she is so deficient that, compared to the average cow, she may not still have many points to commend her She would be acceptable in almost any herd

In comparative judging, there is also the advantage of repeatability Not only is it possible to compare ring after ring, with emphasis on the same defects, but the judging weaknesses of the students themselves may be similarly dealt with In short, rings may be frequently presented that stress those weaknesses concerning which students have shown a poor judging record Unfortunately, many college herds do not provide proper material for such repeat classes In such cases, nearby breeder herds may provide the answer

Comparisons an Asset in Buying and Culling

When buying animals, auction sales, especially dispersal sales, provide a splendid opportunity for comparing animals At such times, selection should be somewhat predictive and should take into account the future prospects of the animal Stage of lactation, condition of flesh, except as it foretells health and feeding capacity, bloom, etc , are less important here than they are in the show ring It is the future of the animal that you are buying, and its potential is what you are endeavoring to forecast The opportunity to compare animals under such conditions is distinctly helpful in making wise choices of the animals that are to be added to a herd Chapter 20 deals with the subject of forecasting future prospects in an animal

Many factors must be taken into account in deciding which animals are to be sold from the herd. When the decision is not based upon health, sterility, or productive capacity, it becomes more a problem of desirability in the herd. Such decisions are then based upon a comparison between the strengths and weaknesses of individual animals. In making such choices, weaknesses with a high degree of heritability are more significant than defects of management origin. Bad feet and legs are more objectionable, for example, than a capped hip, lost switch, or a light quarter of an udder.

As the herd becomes uniformally better, culling becomes of less importance in herd management. Some herds, but not many, become so generally and uniformally desirable that the problem is merely a matter of reducing herd members. In such cases, no animals are really culled; they are merely sold to other breeders in order to reduce the herd size to the desirable number of animals. The decision of which animal to sell in herds of this type is based upon many factors. Among them are these: (1) perpetuation of desirable families, (2) conforming to a particular type concept, (3) emphasizing certain qualities such as longevity, (4) putting emphasis upon certain blood lines, etc. Owning a herd of this quality puts a breeder in an enviable position, but, unfortunately, only a few breeders ever attain so high a standard.

chapter 9

The basic qualities of a good dairy cow

There are three basic characteristics that a good dairy cow should possess. They are interacting, and the interplay between them determines the value of a dairy animal. They are so important in judging and selecting dairy cattle that each merits a separate chapter. Simply stated, they are lactation drive, feed intake capacity, and the mammary system. Usually, but not always, if one is clearly present, especially lactation drive, the others are adequately represented also. But it requires the complementary effect of all three working together to achieve the most desired function in the dairy cow. However, the best procedure to follow in understanding and evaluating each characteristics is to study it separately.

Lactation Drive Genetic in Origin

The physiological urge in the dairy cow to produce large yields of milk and solids is genetic in origin. That is, a cow inherits the quality from her parents. Circumstances may prevent the full expression of the character, and this may happen in several different ways, but the potential will, if inherited, be present. If it is pres-

ent but not fully displayed, a change in circumstances usually reflected in better management permits a fuller expression of the character.

More specifically, what is lactation drive and how is it identified and evaluated in judging a cow? In Chapter 4 the term was defined, and its correlation to form changes mentioned. In many books on judging, this character is called dairy temperament, dairy tendency, the appearance of milkiness, or simply dairy-like quality. The character is not in itself the amount of milk a cow produces or is capable of producing.

Milk Yield is the Product of Lactation Drive and Herd Opportunity

Milk is the product of a dairy cow that measures her response to herd opportunity. Change the opportunity, and the response is different; change the lactation drive and the response is also different. In other words, improve management, and production increases; improve the potential of the cow, and production is very likely to be improved. From a judging and selection point of view, the visible characteristics of the animal that portray or forecast (in the calf or heifer) the presence or absence of lactation drive or milkiness are somewhat more elusive and less easily observed than those that are identified with capacity or udder. Lactation drive reacts on type or conformation in two dimensions: namely, in those characteristics that involve appearance, and in those that are related to attitude or temperament.

Dairy Form and Quality or Refinement

Unhappily, quality or refinement in an animal is not easy to define or evaluate. It probably has some correlation, but not much, to smallness or lack of size. The smaller breeds, especially the Jersey, are recognized as possessing dairy form to a greater degree than the large breeds. It is difficult to assign any numerical value to it and therefore it is equally difficult to provide proof that quality or refinement is correlated to yield.

Perhaps the best place to determine quality in an animal is in the head, neck, and shoulder region of the body. An animal with breed character and quality shows a degree of refinement in the features of the face, prominence and clearness of eye, fineness of hair, thinness and length of neck that are not displayed by the

average cow. Figures 9.1 and 9.2 compare two Guernsey heads. Note the differences between the two in the respects mentioned. Not only do the cows differ in quality and refinement but also in strength and alertness. Figure 9.1 displays a much more desirable head and neck than is observed in Figure 9.2. The legends under each figure gives a more complete description of the characteristics to be noted in the photographs.

General Appearance and Dairy Form

It is rather difficult to manage a good dairy cow, that is, one that has a pronounced lactation drive, so badly that she does not display her dairy qualities. In general appearance, she shows alertness, quality of bone, hair, an adequate mammary system with an udder of good texture, and is without excess flesh or patchiness when in lactation. Figures 9.3 and 9.4 show the contrast in general appearance between two cows of the same breed: one displays the qualities possessed by a cow with a highly desirable dairy tendency, and the other lacks those qualities. Note carefully the legend under each figure.

Lactation Drive and Conformation Structure

Conformation structure is more difficult to analyze, and it is basically more important in judging than general appearance. General appearance is evaluated more superficially, at first glance as it were. Does the animal impress you favorably or unfavorably? Are her lines smooth, symmetrical, and pleasing, or are they irregular and tend to offend your concept of desirable dairy form? These are the questions you ask about general appearance, but, as you analyze conformation structure, you ask more penetrating questions.

Does this cow, if I stop to analyze her critically, really possess lactation drive? Does she give the appearance of an animal that has worked hard at the business of milk production? Does she possess the conformation required in a durable cow that will last for many lactations? Basically, what are her strengths and her weaknesses? How will they affect her value in the herd. Thus we inquire into the basic make-up of the animal, into her conformation structure.

Again we turn to a picture portrayal to emphasize these characters and to distinguish between that which is desirable and that which is less acceptable. Figures 9.5 and 9.6 provide this oppor-

Fig. 9.1 This is the head of Tullis Farms Peerless Anita chosen by the type committee of the Guernsey breed as highly desirable. It is an excellent Guernsey head. It possesses strength, alertness, breed type, and splendid quality. Note the large bright eye, the open nostril, strong muzzle, and good dish between the eyes.

Fig. 9.2 Contrast the head and neck of this cow with that of Fig. 9.1. This head lacks quality, breed character, strength, and alertness. The head and neck tend to portray the kind of cow better than any other part of the anatomy.

Fig 9 3 This Jersey cow possesses good dairy character and shows evidence of high productive capacity She has good depth of body and a highly capacious udder and mammary system Each lactation she produced 200 to 250 lb more butterfat than the cow shown in Fig 9 4

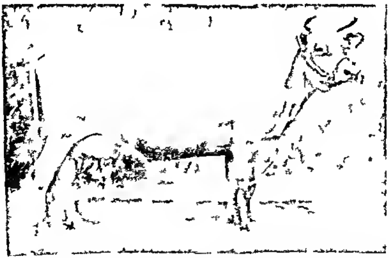


Fig 9 4 This cow is smooth and has quite good Jersey type However she lacks markedly in dairy qualities and lactation drive Her udder is small and of poor texture She is also somewhat deficient in body capacity

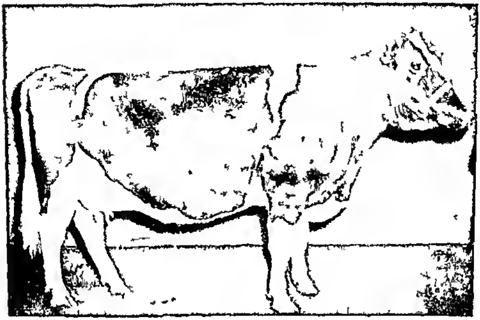


Fig 9 5 This Holstein cow is smooth and very deep in chest and body She appears to be lacking in dairy qualities Her neck is shorter and much thicker than that of the cow in Fig 9 6 Although she appears to be dry or nearly dry, her mammary system is not indicative of heavy production

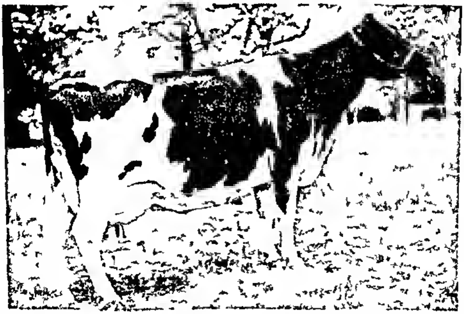


Fig 9 6 This cow is also smooth, but much superior to the cow in Fig 9 5 in dairy tendency and evidence of production This is Inka Pietje Veeman, All American aged cow in 1955 She combines excellent conformation and dairy qualities as well as almost any cow of the breed

tunity for comparison. The first cow, in a hurried analysis, is pleasing to look at, but she lacks the real capacity and value of the second cow shown in Figure 9.6.

Lactation Drive, Alertness, Activity, and Appetite

A cow ordinarily consumes TDN somewhat in proportion to need. If she is milking heavily and, therefore, utilizing a large proportion of the nutrients that she consumes in her milk, she is more eager to graze and eats her feed with apparent relish. Since the yield of milk is, in considerable measure, determined by inherited lactation drive, to that extent alertness, eagerness to consume feed, etc., are associated with lactation activity.

Before a very prominent Holstein-Friesian breeder, Mr. Peter Small, purchased a cow or bought her son, he watched the cow consume her feed and graze. He counted the bites she took per minute when grazing, noted the speed with which she chewed her cud when resting, and, in short, attempted to evaluate her alertness, activity, and nervous temperament. Sluggish, lazy cows are seldom profitable units in the herd. The best cows are alert and energetic. The attitude of a cow is a good point to keep in mind when choosing animals to retain or add to the herd. Figures 9.7 and 9 8 compare two cows that illustrate this difference. The cow illustrated in Figure 9.8 provides a very good example of alertness and vitality. Study the legends under each picture.

Condition Not Necessarily Negatively Correlated to Lactation Drive

The fact that a milking cow is in high condition, even quite fat, does not necessarily indicate that she lacks dairy qualities. Nor does the opposite situation, extreme thinness, to a point that the ribs and vertebral processes are quite prominent and the muscles are clearly defined below the skin, indicate that the cow has extreme dairy tendencies. Many mistakes are made in evaluating dairy cows by adhering to these nonvalid assumptions

The problem of the judge is to determine whether the high condition is due to an inherited tendency to convert TDN into body fat, which is, of course, a lack of dairy tendency, or to a good appetite. Eagerness to eat is an excellent quality in a cow, and high condition when the animal is dry or near dry is usually an asset. Such a cow may, however, become somewhat thin in flesh when

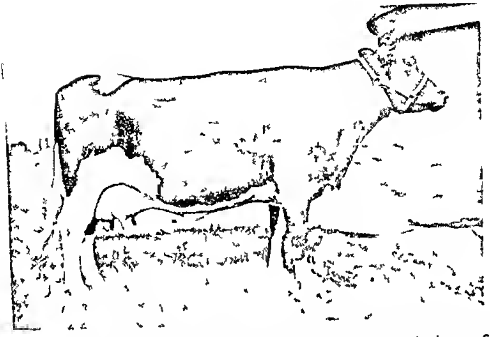


Fig 9 7 This cow lacks alertness Her eye is small and sleepy looking She has size, excellent depth, and sufficient udder capacity, but she is a sluggish cow Her highest record made when she was 3 years and 6 months of age was 12,138 2 lb milk and 383 0 lb fat, 3X, 305 days

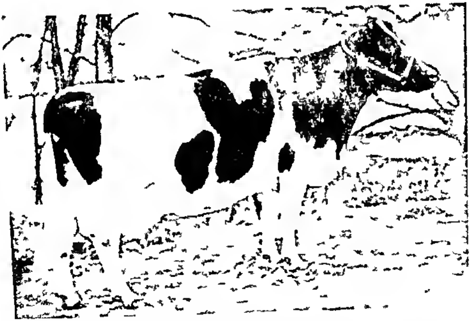


Fig 9 8 Contrast Dunloggin Anna with the cow in Fig 9 7 Although Anna was almost 19 years old when this picture was taken, she is alert, active, and has the appearance of being a heavy producing cow She is for she produced 25 627 lb milk and 941 lb fat at 11 years of age 3X milking

she is in heavy production. This, too, is a desirable quality, as it usually indicates that the cow has a high level of production and produces efficiently.

It is when the cow is fat, because she lacks productive capacity, or thin, as a result of a frail constitution and lack of appetite or inability to consume sufficient feed, that the judging problem becomes serious. It usually requires more than a superficial examination of an animal to enable a person to make a proper decision when these situations exist.

The most valid clues in resolving this problem are these: (1) Does the general appearance and conformation structure of the cow indicate that she is not likely to be a good milk producer? (2) Is the flesh hard and laid on in patches, especially at the tail head and along the back? (3) Does the flesh seem recently deposited, and can it be moved about (shaken) easily when the palm of the hand is placed firmly upon the flesh in the rump region between the hook and pinbone? (4) Is the cow moderately long and slender in neck, clean at the throat, and does her mammary system give the impression of being capable of secreting large amounts of milk? If the answer is *no* to the first two questions and *yes* to the last two, the cow probably possesses lactation drive and is a good producing cow. If, on the other hand, the answer is *yes* to the first two questions, it is unlikely that the cow is capable of being a good producer of milk.

chapter 10

Body development and feed intake capacity

Feed Intake Associated with Strength and Body Capacity

It is the digestive system of the cow that carries the responsibility for the ingestion, digestion, and absorption of feed, but it is the mammary system that converts feed energy into milk energy. There is some positive correlation between the size of the digestive system and the capacity of an animal to utilize feed, just as there is a positive relation between size of udder and milk yields. Beyond the absolute size of the animal is the matter of the relative size of the various parts. For example, an animal that weighs less might possess a larger, more capacious barrel than her heavier stable mate.

Furthermore, the manner in which the animal is put together has a bearing upon both her capacity and durability. These are important points to consider in estimating the functional value of an animal After we have taken account of the functional aspects of body size, we must, in judging, consider the eye appeal of body conformation. In this we deal with the symmetry and form of the animal as well as the body dimensions.

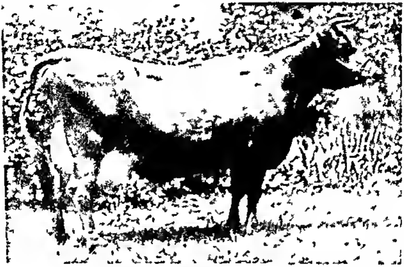


Fig 10 1 Majesty s Iris has excellent depth of chest, spring of ribs, and length of body to match her lactation drive She has several records above 800 lb fat, and in one lactation produced 17,469 lb milk and 957 lb butterfat Her low loin and rough rump, however, lower her type and classification rating

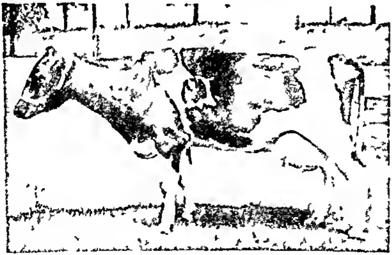


Fig 10 3 This picture portrays a fra l cow with extreme lactation drive but devoid of the physical assets for prov ding proper capac ty She was milk ng 65 lb daily when the photograph was taken but she has so depleted her physical system that she w ll be unable to hold that level of production

Fig 10.2 This is a front view of Majesty's Iris. Make note of her strong, well-proportioned head, and her extreme alertness coupled with rib spring, thus indicating the power to produce.

Feed Intake Capacity and Body Development

It has been pointed out in an earlier chapter that there is a positive correlation between an animal's ability to ingest nutrients and its over-all size. Since TDN from feed is the only source of nutrients and energy available to the animal, with size remaining the

Fig 10 4 Note the narrow, weak head of this cow She is extremely narrow and shallow throughout and lacks rib spring Contrast this figure with that of 10 2

same, that animal which converts the most feed energy into milk energy is the most efficient

Studies have been made by Swett and others which shows that the size of the thoracic cavity is positively correlated with the size of the organs contained within it that is, the heart and lungs Likewise, there is a positive relationship between the size of the body cavity (barrel) and the size of the digestive organs that it houses Thus, a desirable cow is one with a strong, full chest and a well developed, capacious barrel That cows do differ in capacity in these respects is well illustrated in the figures in this chapter

Full, Well-Developed Chest and Strength with Durability

Figure 10 1 shows a cow with a well developed chest You will note that the chest of this cow is deep and well filled at the elbows Figure 10 2 shows the front view of this cow Again you will note that the chest is broad, and the front legs are placed well apart, indicating good rib spring Contrast these two pictures with the animal shown in Figures 10 3 and 10 4 This is a frail cow, weak in cheat, narrow in rib spring, and lacking in ruggedness Such a cow would not be expected to consume large amounts of feed, especially roughage, or to yield large amounts of milk for long periods of time

As you look down over the back and withers of a cow that lacks strength and capacity, as shown in Figure 10 5, and compare her with another of the same breed that is well sprung, as shown in Figure 10 6, it is quite easy to distinguish between the weak and the strong, the undesirable and the desirable Bear in mind that differences of this character occur in varying degrees and that a correct appraisal of the degree of weakness is important in cattle selection or judging

Strength of chest, indicated by a good spring of rib and good depth through the heart, provides a clue to the vigor and durability of the animal Animals that display strength in this region of the body are usually more rugged eaters and continue to produce effectively for a longer period than weak, frail animals do Animals with poor constitutions that show a lack of chest development usually show more response to adverse conditions, do not do as well in loose housing are more likely to go off feed, and generally show more fluctuation in day to day production than strong vigorous animals do

Fig 10 5 This cow passesses width over the hips but lacks strength in the crops and chest Basically she is a frail caw and definitely lacks the strength that is associated with durability

Fig 10 6 Contrast this cow with the one previously shown in Fig 10 5 This cow is extremely well filled in the crops and very well sprung in fore rib The sharpness of her withers indicate dairy qualities She appears rugged and indicates that she should hold up well

Fig. 10.7 Portrays a strong, clean-cut head showing excellent breed type. You would expect a head and neck of this type to be found on a smooth capacious cow showing excellent quality. Turn to Fig. 10.9

Fig. 10.8 Shows a much plainer head, a smaller, less alert eye, and far less breed type than that observed in Fig. 10.7. Turn to Fig. 10.10

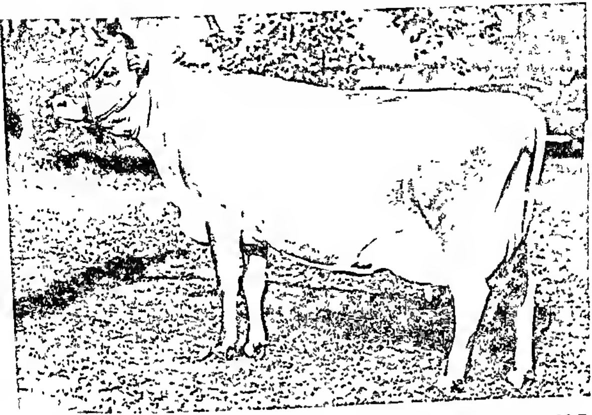


Fig. 10.9 This is the cow thot belongs to the heod and neck shown in Figure 10.7. This is Sybil Design Etto, grond champion ot the Notionol Doiry Show. Note the strength, symmetry, quality, and excellent udder of this cow.

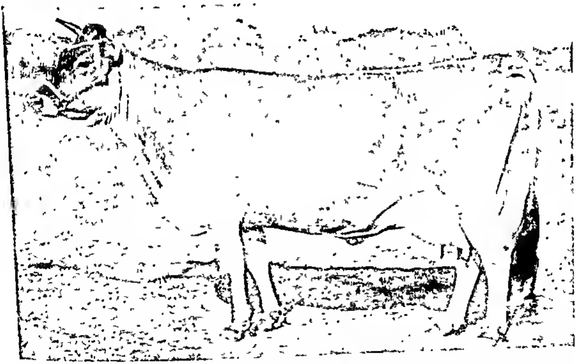


Fig. 10.10 This cow, Gloria Benedictine, lacks the quality refinement, strength, capacity, and excellent breed type of the cow portrayed in 10.9. She is, however, a reasonably good cow of an earlier period.

The Head Is Indicative of the Cow

In speaking of the head and neck of the dairy cow, Professor Edwin S. Harrison[1] of Cornell University and Harden Farms begins his discussion with this sentence, "The head and neck of a dairy cow portrays her strength, breed character, and dairy qualities more strikingly than any other part of her anatomy."

The head is composed largely of bone with a very thin coating of flesh and muscle, and then over this is stretched quite tightly a covering of hide. Because of its composition, the head does not change so much with stage of lactation or when the animal is in high or thin flesh as do most other parts of the body. It thus becomes a good indicator of what the animal actually is. For that reason the head and neck should be carefully studied in evaluating or judging the animal.

A Strong Muzzle and Jaw Is Correlated to Strength of Animal

Generally speaking, but not always, animals are consistent within themselves and between their parts. For example, if an animal is strong in head, more likely than not, it will be strong of chest and body. To that extent, certainly, the head tends to portray the animal to which it is attached. To expand this idea further, if the head possesses breed character, the animal is likely to display breed character; if the head shows quality and refinement, in all probability the animal possesses quality and refinement; if the head is pleasing to the eye, the animal has good prospect of eye appeal.

Let us reveal more of this concept by using illustrations. Figure 10.7 shows a very desirable head, whereas Figure 10 8 shows a coarse, weak, undesirable head. Figure 10.9 shows the entire animal attached to the head and neck shown in Figure 10.7. Note the consistency represented. Figure 10.10 similarly shows the entire animal of Figure 10.8 instead of the head and neck only. By this comparison, it should be easy to conclude that the head and neck are important parts to study, especially when adding an animal to a breeding herd

Strength and Desirable Conformation the Essence of Durability

The more lactations a good dairy cow lives to have, the more cheaply each pound of milk yielded during her lifetime will be pro-

[1] E. S Harrison, H A. Strohmeyer Jr., and J T Carpenter Jr., *Dairy Cattle Judging*, p 20, John Wiley & Sons, New York, 1940

duced. Figure 10.11 shows this quality very effectively. Furthermore, under these circumstances, the longer she lives, the more progeny she will have to perpetuate her qualities. These are two good characteristics to have in a cow. What physical characteristics of the animal are most likely to foretell the presence of these assets?

A cow must be constructed properly in order to last well. That implies that she must possess quality and cleanness of bone, a strong, properly constructed skeleton, good feet and legs, joints free of coarseness or puffiness, a well-developed chest and barrel, and an udder, of course, that is tightly attached to the body and of good texture. Natural hazards, chance, and disease play an important role in determining the life expectancy of a cow, but cows with strength and the desirable conformation indicated above are more likely to survive their environmental perils than cows less favorably endowed.

Functional Size and Capacity

A student of dairy cattle should learn the importance of functional size. Absolute size or weight is not always correlated with functional capacity. A large animal often lacks some important characteristic that is essential to functional value. For example, a large, strong, capacious cow may have a very small, inadequate mammary system. She may be wanting in lactation drive. Because of this, a smaller cow may be functionally more capacious.

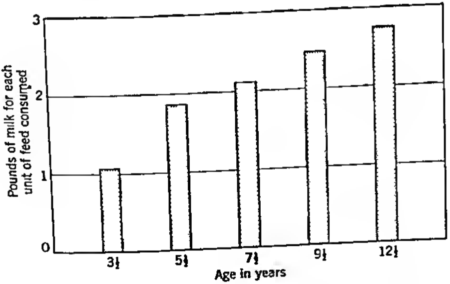


Fig 10.11 Longevity tends to improve production efficiency. Taken from a cow testing report. (From Kvaegavlen i Jylland—For Danish Cows (1933))

It is for this reason that we state: "Other factors remaining the same," the larger cows are more competent producers.

Mostly, what we are trying to establish is the importance of balance and proportionality in an animal. Capacity is achieved when all parts harmonize with each other: when strength of chest and body is accompanied by equally strong lactation drive, by an equally capacious mammary system, when the interaction between all parts of the animal is equal and mutual.

A good guard in football is one who has good size, plenty of strength, leg speed, courage, coordination, know-how, and great desire. It is the combination of these all functioning to full capacity that makes the guard outstanding. Similarly, it is full development of all her characteristics along with size that makes a cow highly desirable.

chapter 11

The mammary system; interplay of function and form

The mammary system of the cow is a most important physical asset. Its job in the good dairy cow is to synthesize milk in quantity, and the system responsible for its production is irreplacable. The mammary system of the cow in its functional capacity is therefore so important to the dairy industry that everyone who works with or studies the characteristics of milking cows should know as much about it as is possible.

It has been pointed out earlier in this textbook that the mammary system of the highly productive dairy cow converts each day an enormous amount of the energy obtained in her feed to the energy of milk. Without this facility, the cow looses most of her functional value. It is accordingly extremely important to be able to identify the physical characteristics of a highly productive udder that can continue to perform its milk-secreting function for five or more lactations. Since the function of the udder when once destroyed or partially destroyed is irreplacable, its lasting qualities are extremely important.

The Mommary System; Interplay between Function and Form

The productive capacity of an udder is determined not only by its size but also by the rate of milk secretion per unit volume.

Thus we are not justified in concluding that a large udder is highly productive or that a small one is unproductive. There tends to be, from an over-all functional point of view, an optimum relation between size and secretion rate in the mammary gland. Other factors remaining the same, that udder is most desirable which is capable of secreting the largest amount of milk from the smallest mass of mammary tissue.

Furthermore, there is a negative correlation between large size in an udder and durability. Large udders tend to contain a higher percentage of supporting tissue than medium-sized pliable udders do. At time of proliferation (making udder) just before calving, large poor-textured udders tend to grow very large, and because of their size and weight endanger their attachments and become an easy prey to injury. Few really large udders last out the normal productive lifetime of a cow.

Shape of Udder as Related to Function

Irrespective of size, the morphology or form of the udder is an important factor, both in the continued function of the gland, and in the satisfaction with which the cow can be milked and managed. A medium-sized firmly attached udder with strong front, rear, and median supports, which is tucked up snugly between the legs and milks out well satisfies the basic requirements of a functioning udder. Figures 11.1 and 11.2 are photographs of the same udder before and after milking. These pictures were taken within 15 minutes of each other, and 38.3 pounds of milk was removed from the udder between the taking of the two photographs. The texture of this udder is excellent, although the shape does not meet all of the requirements of the score card. Functionally, this is a highly satisfactory udder.

Shape and Eye Appeal

There is a high correlation between a functionally well-formed udder and one that also possesses eye appeal. The difference is usually levelness on the floor, length in relation to depth, general smoothness, and size and placement of teats. Figures 11.3 and 11.4 show the side and rear view of the udder of Jane of Vernon, a Brown Swiss cow generally regarded to possess as nearly a perfect udder as any cow of that breed. Bear in mind that her udder combines both functional effectiveness and excellent eye appeal, as

Fig. 11.1 Photograph of the udder of the Holstein-Friesian cow, Illini Sovereign Montvic Mabel, six months after calving and before milking. This udder has held 60 lb. milk (2× milking, 113 lb. daily).

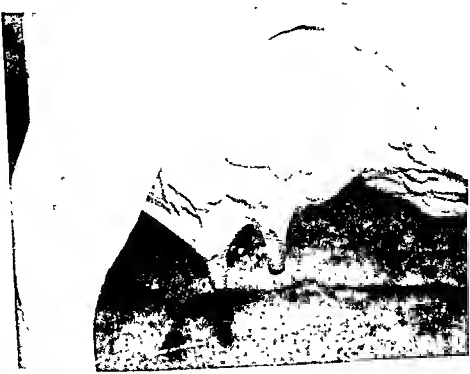


Fig. 11.2 Photograph of the same udder 15 minutes later and after milking; 38.3 lb. milk was removed from the udder. Note the excellent texture of the udder.

Fig. 11.3. Side view of the udder of the Brown Swiss cow Jane of Vernon. This is an excellent example of an almost perfect mammary system. Note the shape, strength of attachments, veination, teat size and placement.

Fig. 11.4. Rear view of the same udder. Make special note of the height and width of rear attachment, balance between the rear quarters, the pronounced crease between the quarters and shape of rear teats.

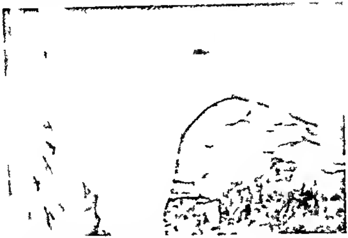


Fig 11 3 Side view of the udder of the Brown Swiss cow Jane of Vernon This is an excellent example of an almost perfect mammary system Note the shape strength of attachments venation teat size and placement

Fig 11 4 Rear view of the same udder Make special note of the height and width of rear attachment balance between the rear quarters the pronounced crease between the quarters and shape of rear teats

most really good udders are expected to do. If you will study this udder, you will note that it has strong attachments in all dimensions. It has capacity and symmetry without undue size. There is every evidence of a strong median support because the teats hang plumb, and the rear udder shows a well-defined crease from the top down to well between the teats. Few udders that produce well will hold their median support unless they possess this well-defined crease between the two halves of the udder.

Mammary Tissue Structure and Texture

The interior of a lactating udder is highly vascular. There is, of course, the arterial system responsible for getting the ingredients for the making of the milk into the udder as well as preserving the health of the gland. The venous system removes the blood and carries away the excess of milk-making materials not used at the time and also the waste products resulting from the milk-making process and in the functioning of the tissues. The circulatory system of the udder must have adequate capacity because it has been estimated by Shaw and Petersen[1] that as much as 387 volumes of blood flow through the udder to produce one volume of milk. Furthermore, in a highly productive udder of good texture, there is an extremely intricate and complicated milk-secreting and milk-removal mechanism. Figures 11.5*a* and *b* shows the interior of an udder excellent in shape that was yielding somewhat more than 40 pounds of milk daily when the cow was slaughtered. The photographs in this figure was obtained by the vinyl acetate infiltration process.[2]

This process was developed by the author and provides an excellent method for demonstrating the milk-holding and removal mechanism of the cow's udder. Actually what you see in the photograph is the solid vinyl acetate material which was injected through the teat canals into the udder as a liquid after the gland has been removed from the cow at time of slaughter. The tissues have all been digested away, leaving only the vinyl acetate. Study carefully the legend under the picture. This clearly demonstrates the highly vascular, spongy nature of an udder. After milking and before injection, this udder was extremely soft and pliable to the touch, indicating good texture.

[1] Shaw and Petersen, *J Dairy Sci*, 22. 7–16, 1939

[2] Described in the textbook, *Dairy Cattle*, pp 278–287, by Yapp and Nevens, John Wiley & Sons, New York, 1955

Fig 11 5a This is a photograph of the interior of a cows udder What you are seeing is the top of the udder or that portion nearest to the body of the cow The front of the udder is at the top of the picture On the right side of the udder the front and rear quarters were injected with different colors of vinyl acetate The large external pudic artery on the left side is shown in a different color In this case all the tissue had been d gested away by concentrated hydrochloric acid

The Milk Veins and Veining on the Udder

That there is a great flow of blood through the mammary system of a heavy-yielding dairy cow has already been discussed Naturally this blood must be forced into the udder by the heart and arteries and then removed from the udder by the venous system The arterial system is deeply imbedded and well protected by tissue

Fig 11 5b In this figure a small section of the vinyl acetate material is enlarged It shows more clearly the minute structure of the udder and how vinyl acetate penetrates to the extreme ends of the milk duct system

and thus externally invisible, whereas the venous system is to a considerable extent external and visible. It is this latter system that we usually allude to in judging.

The milk veins or network of veins constitute the large, the most conspicious part of the external venous system. They leave the udder at or near the most forward portion of the front quarters on each side of the body and extend to a point or points well forward on the abdomen of the cow. They enter the body through an opening or openings called milk wells. Figure 11.6 shows a well-developed set of milk veins.

In judging or estimating the production of the cow, of what value are the milk veins? This is a common question. In answer, it is well to state that the largest and most well-developed milk veins are found among the older cows. It might then be stated that, if they do have value in judging at all, their presence provides evidence that the cow has produced well and that the external venous system has been important in the removal of blood from this particular udder. The external venous system is not, however, the only means of getting blood from the udder to the heart. There are two

Fig 11 6 This illustration shows the well developed and highly des rable system of milk veins of Ill ni D ccanel Ormsby Kay Ve ns of this s ze indicate that a large amount of blood can circulate and has circulated through this udder

internal veins that likewise perform this function Graves[3] tied off the external milk veins of a cow and observed the effect upon yield He found that, at the level of production of the cow under obser vation, the milk yield was not reduced by the procedure The world's record cow, Illini Nellie, had one of her milk veins com pletely severed, in a trucking accident, at the point where it entered the body It was ligated near the udder, and during the period of recovery, some three weeks, the yield of milk in that half of the udder was not reduced in comparison with the normal half

What we are saying, in essence, is that a well developed external venous system is indicative of productive ability, but what we should not assume is that the absence of a well developed system, especially in the young cow, is necessarily evidence of low produc tion A goodly number of high yielding cows have not possessed a highly developed external system of milk veins There are other characteristics of the mammary system that are more trustworthy evidences of productive capacity than milk veins

[3] R R Graves An Experiment with Milk Veins *Hoard's Dairyman* 52 687 717 1916

Many dairymen associate the conspicuous network of small veins on the outside of the udder found on some cows as assurance of good texture within the udder. It is probable that, in the majority of cases, this is true, but there are many exceptions. Quite often relatively large and very shapely udders displaying excellent external udder veins are what we call meaty udders. Such udders often are very hard and nonyielding to the touch, and the cows that possess them are seldom high-producing animals. Udders of this character are "foolers," but they can readily be detected by palpating the udder, that is, by examining it by feel or touch.

Some Examples of Highly Desirable Udders

It is beneficial, in forming a concept of the form and appearance of a desirable mammary system, to view as many desirable udders as possible. Figures 11.7 and 11.8 provide an excellent example of a good Jersey udder before and after milking. You will note (1) that this udder is strongly attached to the body front and rear, (2) that the teats have good size and shape and hang plumb, (3) that the udder has length without too much depth and extends well back between the hind legs. Observe also in Figure 11.8 that, after milking, the udder shrinks or becomes smaller in all dimensions except depth, but that it still retains a desirable form.

A somewhat different aspect of a highly desirable udder is well illustrated by the udder of the cow Erindale Dunloggin Anna. Figure 11.9 is produced from a photograph of the cow made when she was approximately eight years old. It shows her to possess an udder of excellent shape and texture that some might criticize because of its lack of size and capacity. Yet that is not a valid criticism since "Anna," calving at eight years and three months of age produced, on 3X, 25,799 pounds milk and 1076 pounds butterfat. To follow the progress of this cow further, we have Figure 11.10 which shows her udder when the cow was almost 14 years old at which time she produced 33,198 pounds milk and 1487 pounds butterfat. This was the second highest butterfat record of the breed when made. It is interesting to note that the udder of that advanced age still remains firm and strong in its attachments and that it is excellent in form. This cow and others like her provide convincing proof of the point made earlier in this chapter: namely, that a desirable udder is one that is capable of secreting a large volume of milk from a small mass of mammary tissue.

To complete the story of "Anna" and to explain in part why she

has proven so competent and durable, let us add Figure 11.11. This figure shows the udder of the dam of "Anna," and this picture was taken when the cow was almost 19 years of age. This udder has endured the hazards of more than a dozen lactations, and yet it still retains its full functional capacity and has a highly desirable form.

The mammary system of the cow ABC Shamrock Mildred is shown in Figure 11.12. This picture was taken in the arena at the 1954 International Dairy Show just after "Mildred" received the grand championship award. This udder provides an excellent example of symmetry, desirable form, and smoothness with good size, but it does not display the evidence of productiveness that is shown by the udders previously presented in Figures 11.3, 11.9, 11.10, and 11.11.

The Mammary System in the Lactation Cycle

The stages in the life cycle of a cow follow this developmental pattern: (1) birth, (2) growth, (3) puberty, (4) conception, (5) gestation, (6) parturition, and (7) lactation. The last four of these are repeated with each new lactation. In completing this lactation cycle, the udder goes through certain rather marked changes Two of these changes are important to the cattle breeder and the judge. Figures 11.13 and 11.14 show the side and rear views of a dry udder, in a young cow, that possesses the characteristics common to a good nonlactating udder. The attachments are firm, showing no evidence of breaking away. The teats are well placed on the udder, uniform in size, and of proper shape. The udder is fully collapsed and shows excellent texture. The udder is level on the floor and has adequate length. The rear attachment is high and wide, the folds of skin indicate capacity, and the crease between the rear teats, together with the tendency of the teats to hang straight downward from the center of the quarter, indicates a strong median or central support. In short, the evidence is all favorable that this udder will be highly desirable when in heavy lactation. Figures 11.15 and 11.16 enable us to check our appraisal of the dry udder, for they are pictures of the same cow in heavy flow of milk as was shown in Figures 13.13 and 11.14 when she was dry. You will note how closely this milking udder resembles those of other cows presented earlier in this chapter. Carefully note the legends under each of the last four figures.

Now that we have become familiar with the characteristics of a

Fig 11 7 This is the udder of the Jersey cow, Pinnacle X Basil Teffia, before milking This udder possesses excellent form and superior texture The teats are well placed on the udder, hang plumb, and are of desirable size

desirable mammary system, perhaps it is the proper time to study the nature of udder defects. These might be divided into two large groups: (1) those that are largely hereditary in origin, and (2) those that are the result of natural hazards, management, or mismanagement. The nature of udder defects are such that animals with in-

Fig 11.8 The udder of "Teffia" after milking Note that the udder holds its excellent shape The udder after milking simply becomes smaller as a good udder should

Fig 11 9 *This is the udder of the Holstein cow Erndale Dunloggin Anna when she was 8 years old* This udder combines excellent shape and splendid *texture* yet is relatively small Udders of this type are held snugly to the body are little subject to injury and they possess lasting qualities

Fig 11 10 Anna s udder 6 years later (at 14 years) Note that it has retained *its shape* and soundness but is more capacious This cow and others like her teaches a lesson in udders that should not be *forgotten*

Fig 11 11 This is the udder of the dam of Anna, Dunloggin Duchess Anna, when she was 19 years old Durability is illustrated in the udders of these two cows

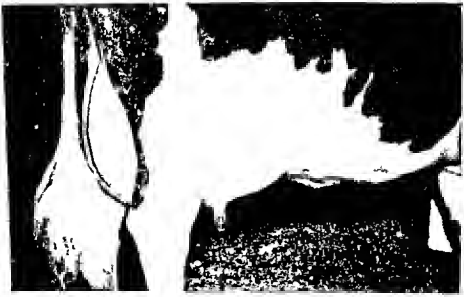


Fig 11 12 This is the udder of ABC Shamrock Mildred just after she was made grand champion Holstein cow at the 1954 International Dairy Show This udder has excellent symmetry and smoothness It does not show quite the evidence of production displayed in the previous udder and should be somewhat higher in its rear attachment

Fg 11 13 S de v ew of the udder of a young Ayrsh e cow that s dry The udder has collapsed nto ts smallest nonlactating state Note the extremely small s ze yet h ghly des rable form

Fg 11 15 S de v ew of the udder shown in Fg 11 13 but taken two lactations later *Note the s ze and shape of the udder Observe that the teats are well spaced hang plumb and center well under the quarters*

Fig 11 14 This is a rear view of the udder shown in Fig 11 13 The attachment is wide and high, the rear teats point toward each other and there is a good crease between the two rear quarters These are good qualities in a dry udder

Fig 11 16 Rear view of the udder shown in Fig 11 14 (two lactations later) Observe that when full of milk, the rear teats are well apart and hang perfectly straight These four figures illustrate that good dry udders are usually small and tucked up closely to the body

herited weaknesses react more quickly and more completely to injury, disease, or mismanagement than normal animals do. Consequently, this interaction effect tends to make such a classification based upon inheritance and management hazards unrealistic. We will therefore classify defects more on the basis of their frequency and importance in dairy cattle breeding and management.

The Nature and Character of Udder Defects

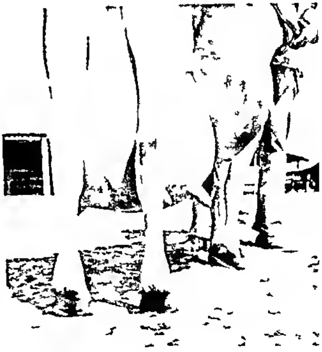
Defects occur with different degrees of severity. Certain defects may affect eye appeal but have very little influence upon milk yield, ease of milking, or management. Other defects when severe may make the animal unacceptable for the average herd. Although opinions may differ somewhat upon the significance or importance of a particular udder defect, good judges will agree that the defect does exist, and the more competent among them will view defects very much alike.

Strength or Soundness of Udder Attachments

Aside from form or shape defects, which may or may not be functionally important, most of our udder problems arise from some kind of an attachment failure. Figures 11.17*a* and *b*, 11.18, and 11.19 show three different types of such failures. The *first* and most undesirable is a failure of the median or central support. In udders of this type the floor of the udder drops down and the teats point outward. In front attachment failure, one or both front quarters of the udder separate from the body. The third is the failure of the rear attachment. This is usually accompanied by very poor udder texture.

Why do such failures occur? Figure 11.20 shows an udder that has been dissected away from the body sufficiently to show the ligament of connective tissue that connects the udder to the body of the cow. This ligament provides the main support of the udder. If it is weakened, the center of the udder separates to some degree from the body. Figure 11.21 shows the disc that holds the median suspensory ligament to the body of the cow. The udder pictured was excellent in shape, and, although the cow had been milking through several lactations and had suffered severe attacks of mastitis in at least three quarters, there was no evidence of a weakening of the median attachment. You will note that this disc of connective tissue was very large and strong. Contrast the anchorage

Fig 11 17a The median suspensory ligament of this udder has failed and the center or floor of the udder has dropped down so badly that the teats are above the floor of the udder and point outward instead of straight downward as they should This defect usually becomes worse with each new lactation



11 17b This young Jersey cow has an extremely severe case of udder edema just prior to calving The swelling is so extensive that the udder attachments especially the median support have been seriously impaired Such cows have little if any value in a dairy herd (Photo supplied by John C Wilk A J C C 1957)

Fig 11 18 This is an excellent example of a failure of the fore quarter udder supports. *In this cow the front quarters of the udder have completely separated from the body* and left a cavity between the udder and the body. This defect tends to get worse. This young registered cow will ultimately be sold for beef.

Fig 11 19 This udder is quite low and relatively narrow in its rear attachment. Being narrow at the top and wide at the bottom it hangs in front of instead of back between the rear legs. *Udders* of this type are usually poor in texture as this one is and easily *subject to injury*.

Fig 11 20 This picture shows an udder partially dissected away so that the median suspensory ligament which supports the udder would be visible. A strong central support is indespensible if an udder is to remain in a healthy condition and last out the long life span of a good cow. (Photo supplied by W W Swett *USDA*.)

of this udder with that of the udder shown in Figure 11.22. (Read the legends below each photograph carefully.)

In Figure 11.22 the body contact of the median support is narrow and relatively short. When this cow was slaughtered, even though she was quite young, her udder exhibited signs of separating from the body. In both figures mentioned above, we are attempting to explain what caused the type of udder failure alluded to in Figure 11.17*a* and *b* (of the central median support).

The type of defect illustrated in Figure 11.18, namely, a separation of the front quarters from the body, is highly objectionable, but, unless accompanied by the mid-udder support failure, it may not interfere too seriously with production or with satisfaction in milking. Quite often such failure appears in one fore quarter only, and, although it does reduce the value of the cow materially and lowers her classification rating, if the teats hang plumb and the breaks are not too pronounced, the cow may live to have a fairly normal productive life. Breeders with much experience are of the opinion that poor management, especially just before first calving, may account to a considerable degree for this type of defect. Prepartum milking, especially before first calving, accompanied by moderate exercise during the period the cow is making up before calving, has a tendency to reduce the amount and hardness of edema, and thus tends to reduce the incidence of this type of udder damage.

Rear udder attachment failure is usually due to a very narrow and low rear attachment. This defect is accentuated if the udder is large and meaty in texture, as it usually is in pronounced cases of this defect.

Udder Shape and Size

It is probable that the most frequent or common defect of an udder rests in its shape or form. Deviations from highly acceptable form in an udder are many and highly varied. It is impossible to picture more than a very few such defects, but, based on the nature of those shown and by comparison with desirable udder form, others should be readily recognized. Figures 11.23 and 11.24 show udders that are, for different reasons, highly undesirable. The legend accompanying each figure explains the nature and character of the defect.

Fig 11 21 This photograph was taken immediately after the udder had been dissected from the body of the cow and shows the extent of the median suspensory ligament support The heavy line indicates the limits of the support which was almost a square foot in area This large cow (1700 lb) had an excellent udder that was snugly attached to the body It requires a strong anchorage to properly support a large heavy milking udder

Balance between Quarters

Experiments have demonstrated that, in the normal udder approximately 60 per cent of the milk is obtained from the rear quarters, and 40 per cent from the fore udder In a normal udder, the two halves, right and left, produce essentially equal amounts Functionally, it is more important to have the rear quarters well developed than the fore quarters of the udder Furthermore, a minor deficiency in size in the fore quarters is more likely to be at least partially corrected as the animal matures (see Chapter 13) than is a similar deficiency in rear udder development

A lack of balance between quarters either front or rear, may be serious or minor depending upon certain factors For example, a lack of balance especially in rear quarters is less significant when the animal is nearing the end of a lactation than it is at the beginning of one It is not uncommon in the drying off process for one quarter to reduce in lactation rate before another quarter and thus appear deficient, yet both may appear normal and equal in the

Fig 11 24 This udder is extremely deficient in the fore quarters The rear udder is poorly attached which causes the udder to swing forward in front of rather than between the rear legs

Fig 11 25 This udder has a rather deep stricture between the front and rear teats The udder is poorly attached in front and quite deep

Fig 11 23 This udder is very deep, extends below the hocks, and is pointed rather than level on the floor The teats are small and poorly placed on the udder The rear quarters are deficient in comparison with the fore quarters

centered and the animal is bagged, especially if milking heavily soon after calving, the udder will stretch and tighten the tissues in that area, thus tending to level the floor of the udder, and the teats will hang straight downward. This leveling of the floor will tend to minimize the defect If the stricture is located just behind the front teats, when the udder is bagged the front teats will tend to point backward instead of straight down as they should If, on the other hand, the stricture is in front of the rear teats, when the udder is bagged they will point forward instead of downward

It has been explained that there should be a rather clear line of separation between the two halves of the udder This does not imply that the quarters, especially the front quarters, should be widely separated as they sometimes are in otherwise acceptable udders Figure 11 26 illustrates this defect If this defect is severe, the udder usually is deficient in front attachments, hangs low, swings in front of the hind legs when the animal walks, and is easily injured

Fig. 11.24 This udder is extremely deficient in the fore quarters. The rear udder is poorly attached, which causes the udder to swing forward in front of rather than between the rear legs.

Fig. 11.25 This udder has a rather deep stricture between the front and rear teats. The udder is poorly attached in front and quite deep.

Fig 11 26 This picture portrays a double weakness in an udder First the front quarters are widely separated with a deep crevice between the two halves of the udder The second weakness is a median support failure with the teats pointing outward

Teat Size, Shape, Placement, and Soundness

Teats may be of a convenient size, texture, and shape, thus making milking easy and adding to the eye appeal of the animal, or they may be too small or too large for convenient handling Since machine milking is almost universal, and hand milking has been largely discontinued, especially in our larger herds, teat size and shape is less of a factor in ease of milking Many factors may contribute to the ease or difficulty with which a cow can be milked The speed or rate with which milk may be removed from a teat depends upon the size of the teat orifice (opening) and the tension of the sphincter muscle that closes the teat opening

Figure 11 27 shows teats entirely too large for ease of milking The front teats were at least five inches long and two inches across Figure 11 28 shows teats so short and small that the ordinary milking machine cluster is constantly falling off during milking If milking is done by hand and teats are of this size, the milking time would be from two to three times as great as that required to remove the same amount of milk from an udder with teats that were of convenient size and shape

Fig 11 27 An excellent example of teats that are both too large and too long The front teats are 6 inches long and more than 2½ inches through

Occasionally, but not often, so called double teats occur In this case the teats are usually somewhat larger, especially at the base, and instead of one normal opening there are two openings The second opening is usually half or two thirds of the way down the teat at the end of the second or auxiliary teat This second teat may be associated with a small pocket of secreting tissue for which

Fig 11 28 Contrast teat length and size with those shown in Fig 11 27 In this cow the teats are entirely too small and too short for convenient milking

it provides a means of release for the milk, or it may be associated with an entire quarter In either case, it seldom possesses a normally large opening and usually yields but a small amount of milk More rarely, we find that the teat is double all the way down and that both parts are almost of equal size The teat in this case is usually considerably larger and flatter than its mate

If milking is done by hand, the double teat makes milking difficult and messy, if it is done by machine, there is usually less of a problem In any case, the defect is objectionable and seemingly heritable In judging or classification, discrimination against this is relatively severe, depending, of course, upon the nature of the defect

Extra openings on the side of a teat may vary in size and importance If they are extremely small, invisible except by careful scrutiny, and do not permit milk to drip, they are functionally unimportant If their presence is suspected when one is judging, they can be easily identified by holding the end of the teat with one hand and putting pressure above the suspected opening with the other If milk spurts out of the opening in any sizable stream, the condition should be regarded as an appreciable defect If, on the other hand, only a few drops or no milk at all are obtained, regard the defect as unimportant

It appears that teat defects involving either double teats or extra openings are more frequently found on the rear teats This apparent tendency raises the question of supernumerary teats

The word supernumerary means above or beyond the normal number Since the normal number is four in the cow, the existence of five or more indicate the supernumerary condition This condition has been thoroughly investigated in more than 15,000 animals of both sexes No research worker has reported less than 20 per cent of the females studied to have shown extra teats, and the highest reported is 69 per cent A summation of the studies indicate that approximately one third of the females have extra teats *Only a small percentage of these extra teats ever function* Supernumerary teats are usually found in three positions on the udder (1) behind the regular teats, (2) between the front and rear teats, usually on one side only, (3) branching from the side of a regular teat and varying in size and location The first type is by far the most frequently found Investigators generally agree that supernumerary teats are inherited, but the mode of inheritance has not been proven

In judging, other factors remaining the same, supernumerary

teats that do not function are not looked upon with much disfavor. Those that are very large and somewhat functional and those that originate on a teat are faulted according to degree. Most supernumerary teats can be removed with safety before a heifer is 18 months of age.

Udder Proliferation at Calving, Edema, and Bagging for Show

Proliferation is the term used to identify the physiological condition commonly called "bagging up" prior to calving. It is the process that provides the udder with the milk-producing and milk-removal system for that lactation. It is accomplished with a rapid development of the gland and is often accompanied by considerable swelling and edema. There is a tendency for the swelling and edema to become excessive in heifers calving for the first time, especially if they are in high condition. It is at this time that ligaments supporting the udder are torn from their anchorage, resulting ultimately in the partial separation of the udder from the body. The edema resulting from calving gradually disappears, more slowly in first-calf heifers, but is usually gone before the fifth week after calving. Figure 11.29 shows a severe case of udder edema at calving.

Fig 11.29 Edema is very common at calving time. It accompanies udder proliferation, which is essential for lactation. Too much edema endangers the support of an udder. This picture shows about as much edema as an udder can endure without injury

Chronic Udder Edema

There is a type of edema that persists in an udder. It involves the superficial tissues of the udder and usually has little tendency to affect the milk. In the more advanced stages, it does reduce the yield of milk and, after two or three lactations, usually results in the disposal of the animal for beef

This type of edema is recognized (1) because of its persistence, (2) because it may almost but never quite disappear, only to become worse again, (3) because it exists on the outer tissues which become enlarged and very tough and leathery to the feel This type of edema practically never completely disappears, and usually becomes progressively worse until it is responsible for the removal of the cow from the herd Figure 11 30*a* illustrates the condition described as chronic edema Figure 11 30*b* shows the empty rear udder of Masteraim Sleeper Dora, grand champion cow at the International Dairy Show in 1957 Compare with Figure 11 30*a*

Bagging Udders for Display Purposes

It has been the regular custom to bag (permit the milk to accumulate in) the udders of cows in milk before sales, exhibitions, and in the show ring Quite often either the exhibitor is overzealous, and permits too much milk to accumulate in the udder and thus overbags the cow, or he has misjudged the amount of milk required to fill the udder so that it will present its best appearance In either case, the udder is very much distended, the teats often strut because of the extreme pressure built up in the udder, and the general impression created is less favorable than it would be if only about two thirds as much milk had accumulated in the udder

Occasionally a cow will be bagged so long and so tightly that she hives. In this case small welts appear over most of the body These cause distress in the cow and create an unfavorable impression upon the ringside or a purchaser Milking out relieves the condition in a relatively short period of time. Hives in cows may be avoided by studying the way a cow bags up This is done by letting the udder fill to a desirable size and keeping a record of the amount of time required This then determines the amount of time needed for the udder to fill to the desired size when the cow is bagged for the sale or show

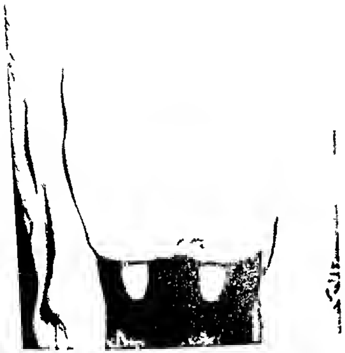


Fig 11 30a This photograph pictures a severe case of chronic udder edema The edemic tissue covering the rear of this udder is almost an inch in thickness In dentations made in this tissue remain for many minutes Although this cow was milked just before the photograph was taken, the tissue did not reduce in size The cow calved several months before the picture was made, and this type of edema is not associated with the edema of calving

Fig 11 30b For comparison with Fig 11 30a, the rear udder of Masterairn Sleeper Dora, the grand champion cow at the 1957 International Dairy Show, is shown Note the difference between the normal rear udder of this cow and that of the cow in Fig 11 30a In this case the skin is thin and normal looking with the udder veins clearly defined

chapter 12

Head, neck, shoulders, and chine: feet and legs

An experienced judge can tell a great deal about the kind of animal he is observing by simply viewing the head. It is said that the face of a person reveals his character off-times more reliably than do his words. Therefore, when in search for the innermost truth, be it concerning man or animal, it is the valid clues that should be examined.

We observed earlier in our discussion of the anatomy of the cow that the head is a bony structure. This being true, management has relatively little influence upon the part except as it relates to its growth. Consequently, the head changes very little as condition, stage of lactation, etc., exert their influence upon the appearance of the animal. Because of this, and by reason of the fact that the head portrays dairy qualities, breed character, and over-all strength and vitality, it is an important part to observe in judging a bull or cow.

The Head Portrays Strength and Vitality

A desirable head, in any breed, is one that displays breed character, refinement without frailty, desirable proportions, strength

with good muscling of the lower jaw, combined with alertness and apparent interest in the surroundings. There is considerable variation among breeds in the size and shape of head, the refinement and quality of features, and eye appeal. Perhaps these qualities can best be presented by the use of examples.

To portray the characteristic of a desirable head, Figures 12.1 to and including 12.5 show heads of well-known mature cows of the five major dairy breeds. The legends accompanying each photograph describe the different features of the head in considerable detail.

In order to emphasize the contrast between a desirable and an objectionable head, Figures 12.6 through 12.10 illustrate weak, undesirable heads in the same breeds. Study the legends carefully, and learn to distinguish the differences between desirable and undesirable heads.

The Head and Neck Depict Lactation Drive

It is difficult to conceive of any quality in a dairy cow that is more important to her success in the milking line than dairy tendency or lactation drive. The best measure of this quality in the milking cow is, of course, the actual yield of milk and fat. But this knowledge is not available for the great majority of cows and impossible to secure for the calf or uncalved heifer. In such cases the physical qualities of the animals provide about the only available evidence upon which to estimate production.

Fig 12.1 This is the head of Windrow Preferred Pet, a very highly regarded Ayrshire cow. It portrays breed character, strength, alertness, and dairy quality. The eye is clear, the muzzle strong and the nostril relatively large. The head shows good proportionality. The horns are of good quality and well shaped. (Courtesy, Ayrshire Breeders' Association.)

Fig 12 2 Shows the head of Lee s H ll Keeper s Raven It s a strong head and portrays a strong cow of excellent qual ty The features are clearly ch seled and the eye s prom nent and alert look ng The muzzle is strong and broad It s the k nd of head you expect to be a part of a cow w th splend d breed character (Courtesy Hoard s Da ryman and Brown Sw ss Breeders Assoc ation)

Figure 12 11 pictures the head and neck of a cow that shows ex cellent evidence of dairy tendency In this case the features are cleanly chiseled and display refinement the eye is large and ex tremely alert and the muzzle strong and powerful. Furthermore the neck is long thin very clean and free of tongue fat at the

Fg 12 3 The type comm ttee of the Amer can Guernsey Cattle Club chose the head of Tullis Farms Peerless as one portraying excellent qual t es The head comb nes breed character a clear prom nent eye strong muzzle alertness and excellent da ry qual ty It s an excellent head (Courtesy Amer can Guernsey Cattle Club)

Fig 12 4 The head of Dunloggin Happy Mistress is an excellent specimen to portray the breed It is a head of great strength, yet the features show dairy quality and fine chiseling The face is broad and well dished, the eye clear and bright, the attitude alert and interested (Courtesy, The Holstein Friesian Association of America)

throat In contrast note the head and neck of the cow pictured in Figure 12 12 The head of this cow is narrow and weak The eye is small and dull The neck is short, and the throat fleshy and coarse The milk and fat production are given in the legend under each picture

Fig 12 5 The head of Standard s Rosemary of P H P is that of a relatively young Jersey cow Note the broad, well dished face, the very large, prominent eye, strong muzzle, and fine features This head is somewhat shorter in relation to its width than that observed in the other breeds, but it is characteristic of the breed It is an excellent Jersey head if age is taken into account (Courtesy, American Jersey Cattle Club)

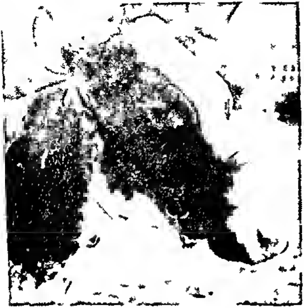


Fig 12 6 There is considerable difference between the appearance of the head of this Ayrshire cow and that of Windrow Preferred Pet (Fig 12 1) This head lacks the clean-cut features, clear prominent eye, strong jaw and muzzle, the desired proportions, general quality and breed character of Pet It is the kind expected on a rather common looking Ayrshire cow

It might also be emphasized here that much of what has been said about the head and neck of a cow is likewise applicable to heifers But that point will be developed more fully in Chapter 22 which deals with the judging and evaluation of the dairy heifer

Fig 12 7 There is a great difference between this Brown Swiss head and that shown in Fig 12 2 This head lacks width, dish in the forehead, and the quality desired in a good Brown Swiss head The eye is small, the jaw lacks strength, and the throat is not as clean as it should be This head definitely lacks breed character

Fig. 12 8 Contrast this Guernsey head with that of Tullis Farms Peerless You will note that it lacks the alertness, clear bright eye, desirable proportions, strength and breed character displayed by "Peerless" In this case there is too much distance between the eye and nostril for desirable proportions, and the head is too narrow for its length

The Withers, Crops, and Chest of the Dairy Cow

There is a general impression held by many that a good dairy cow is always very sharp and narrow at the withers. Dairy cows are not always conformists, and statements of this character require careful analysis. In the first place, condition has a great deal to do with thickness at the top of the shoulders. A cow in heavy flow of milk and relatively thin in flesh will usually be sharp at the withers, whereas the same cow in high condition just before calving may show a thickness of 5 to 6 inches in this region. Obviously the dairy tendency has not changed, and the cow is likely to have even a better lactation production because of it than she would if she had lacked this extra flesh at calving time.

Cows with rugged constitutions and good appetites will build up their bodies when dry or at almost any time that the nutrients which they consume are not all required for milk production and maintenance. This is a desirable quality in a cow and not a deterrent to good lactation drive. What is more important to the

Fig 12 9 This Holste n head is too long and nar row *It lacks the dish n* forehead and strength of muzzle and jaw displayed by Mistress (Fig 12 4) This is a weak head defi nitely lack ng in qual ty and breed character The head is too long from eye to nos *tr l and the nose* points for ward much too far

dairyman and breeder is a knowledge of those qualities that con stitute strengths and weaknesses in this region of the body

It is important to the productive and vital future of an animal that the skeleton provide ample space in which the vital organs are located and compelled to operate The thoracic cavity is created

Fig 12 10 As a breed Jerseys generally show good qual ty and breed character in head The cow portrayed here has a head that is not seriously cr t cized for lack of proport on but more for its lack of qual ty breed character and ev dence of da ry qual ties *The eye* is rather small and the d stance *from the eye to the muzzle* is greater than desired The throat s not as *clean* as it should be and the head lacks in alertness and fine ness of feature It is the type of head not usually associated w th h gh pro ductive capacity

and its size determined by the ribs, backbone, sternum, and diaphragm It is in this space that the heart and lungs are located In the high-producing dairy cow, an enormous responsibility is placed upon these organs It is the heart that circulates the blood to all parts of the body, and the lungs that continually oxygenate it for re use

A dairy cow weighing 1500 pounds and producing 40 pounds of 3 5 per cent milk gives out in this milk, in the form of useful food, 11,895 calories of net energy A horse of equal weight, in pulling an average load for 8 hours, performs 5130 calories of useful work In other words, the horse would be obliged to work 18 5 hours to perform the same amout of useful work as the dairy cow Furthermore, it was learned in Chapter 8 that the heart would have to pump approximately 15,500 pounds of blood through the udder to produce this amount of milk There is no doubt but that the dairy cow is "the work horse" of the bovine family

Fullness at the crops and especially spring of fore rib along with depth of rib and fullness at the elbows are the determinants of the

Fig 12 11 The cow has a large bright eye good features and a strong muzzle She shows alertness and vigor She is clean and dairy like looking in the neck and gives the impression of being a capable producer She produced in her first three lactations at an average age of 3 years and 7 months an average of 17 230 lb milk and 560 6 lb fat in 3 times 305 days

Fig 12 12 Contrast with Fig 12 11 This animal even though somewhat larger lacks the evidence of productiveness of the former cow She lacks the alertness quality strength of muzzle and vigor displayed by the cow in Fig 12 11 This cow at 3 years and 6 months of age produced 12 138 lb milk and 383 lb fat on 3X, 305 days

strength and largely the vigor of the individual A frail cow may start a lactation at a high level of production, but she seldom finishes the lactation at a comparable level Furthermore, she is less likely to survive the hazards of production and herd life as well as the more rugged animal

Perhaps strength of chest is more closely associated with and more likely to be the determinant of durability and longevity than any other part of the animal In our better cows, with costs of rearing replacements going up, the need for lengthening the productive life span of a good cow becomes increasingly important It should be emphasized, however, that no good purpose is served when a poor cow survives for a long period of time

Feet and Legs

Feet, pastern, and leg weaknesses belong in the category of defects that grow worse with age These are discussed more fully in Chapter 13 It must be emphasized here, however, that leg weaknesses can be a serious problem in a herd The high heritability of these defects adds to their seriousness

It should be made clear also that the effects of such defects tend to be compounded. That is, a serious condition in one area, such as inflamed coronary bands or widely spread toes, tends to cause the animal to favor that part and thus aggravate another weakness Puffy, inflamed hocks usually cause the animal to flinch and thus add to an already present leg weakness

chapter **13**

Evaluating the significance of defects

Identifying and Evaluating Defects

If it is necessary to define defects in dairy cattle, it might be done briefly by stating that defects as you are expected to view them are negative deviations from the ideal standards of excellence set up for conformation in Chapter 7. In show-ring judging, however, defects are more likely to be negative deviations from the concept of the ideal animal that is carried in the mind of the judge.

Defects may be broadly separated into two classes: (1) those that affect function, and (2) those associated with eye appeal. Naturally, defects in the first classification are more important to dairymen and more serious in reducing the value of an animal than those in the second category. Logic forces one to conclude that any defect that tends to reduce milk yield, that is associated with reduced fertility, or that otherwise reduces the length of the functional life of a good animal is of serious consequence to a breeder or dairyman. Therefore, in evaluating animals, place the most emphasis upon, that is, discriminate more severely against, defects that are functional in character.

DEFECTS THAT AFFECT FUNCTION

Good examples of defects that affect functions are (1) a lack of body capacity, (2) a deficiency in lactation drive, (3) a small and inadequate mammary system, (4) poor udder attachments and a poor udder texture, (5) weak hind legs and poor pasterns, (6) badly winged shoulders, (7) a considerable lack of size, etc Let us consider the relative importance and influence of these and other similar defects upon the real value of an animal

1 *A lack of body capacity* Body capacity is relative and should be considered in terms of the size of the particular animal involved In other words, does an animal lack capacity of body for its size? In what respect does it lack size, and how does the want of body capacity affect its productive ability? High producing cows con vert a great deal of energy from the feed they consume into the energy of milk A quart of milk of essentially average composition contains about 735 calories* of energy Holstein Friesian milk would contain approximately 665 calories in each quart, and Jersey milk roughly 906 calories The average caloric intake of a per son is 2600 calories per day, and an acre of average crops when utilized most efficiently, that is, balanced to best supply needed nutrients, contains approximately 711,800 calories of energy avail able for milk production

It is clearly evident by a small amount of computation that a Holstein cow producing 100 pounds of milk per day would require in the feed which she consumes a minimum of 30,257 calories to provide the energy in the milk alone This would not account for maintenance, digestive losses in the process etc What we are seeking to emphasize is that the digestive tract of an outstanding cow must have capacity, must have room to work in, especially as roughage is a good and cheap source of digestible nutrients and of energy Large digestive systems are not contained in small, skimpy barrels or bodies It should be made clear, however, that young cows are not expected to possess the body capacity of mature ani mals, and that a large body alone is not a guarantee of high milk producing capacity That quality as you have already learned is determined by many interrelated factors

* A calorie (small) is the amount of energy required to raise one gram of water (maximum density 4 C) one degree centigrade A large calorie is equal to 1000 small calories The calories here referred to are large calories A quart of milk weighs 2 15 pounds

2. *A deficiency in lactation drive:* The importance of production potential, lactation drive, or genetic capacity is indispensable in the cow if she is to carry out the function of high-level milk production. A lack of this ability is one of the first guarantees of inefficient production. The points to look for in the cow to insure the presence of this quality were discussed in Chapter 8.

3. *A small and inadequate mammary system:* Functional capacity is more important than physical size or mass in an udder. A point that should be emphasized also is that a smaller, stronger-attached, and better-textured udder is less subject to injury or disease than a very large udder, and therefore is to some degree correlated with the durability or longevity of the animal.

Consequently, the lack of size referred to in this instance means a lack of functional size. It probably is, but might not be, associated with actual size of udder. Figure 13.1 pictures a mammary system that lacks functional capacity.

4. *Poor udder attachments and poor texture:* Perhaps no single physical quality or characteristic in a cow is more likely to cause her to be removed from the herd at an early age than a large, loosely attached udder. *Generally udders of this form are poor in* texture also. Figure 13.2 shows an example of this weakness. Udders of this type and size are easily injured and readily become a prey to mastitis organisms.

Fig 13.1 The udder portrayed lacks functional capacity. The fore quarters especially are deficient This picture was taken just before milking, and, when milked out, this cow yielded 6.3 lb. of milk, which was approximately as much as she produced at any milking during her lactation

Fig 13.2 This cow was in mid-lactation when the photograph of her udder was made. The udder is quite large and of poor texture It is also very loosely attached. In her next lactation the udder failed so badly that it was necessary to sell the cow for beef.

5. Weak legs and pasterns: The average life span of a cow in a herd is relatively short, probably not more than two and one-half lactations (4.5 to 5 years). This fact may he responsible for the lack of attention that has been given by dairymen to poor conformation in legs and pasterns and feet. It does not, however, excuse a hreeder for not recognizing the importance of good feet and legs in the hreeding and development of his herd. A more complete discussion of this important weakness will follow later in this chapter.

6. Wing shoulders: Mention was made of the structure of the shoulder and its relation to the skeleton of the cow in Chapter 5. The manner in which the shoulder is attached to the body in the cow makes it likely, if the tissues binding the shoulder blade to the skeleton are weak, that the shoulder may lose its solid contact with the body proper, and thus impair the value and appearance of the animal. The tendency toward this weakness is to a considerable degree heritable, and the prohability of its existence in a herd is somewhat of an intrabreed problem. The Guernsey hreed shows the weakness more frequently and more severely than the other dairy breeds.

7. Smallness, genetic and nutritional: The breeders in different regions of the country have a somewhat different attitude with regard to size of cow. This is accredited in part to the topography of the land and to some degree to the availability of feed and pasture. In the rougher, less fertile areas, the cattle tend on the average to he somewhat smaller. Management practices, availability of feed, and market demands are also to some degree determinants

of phenotypic size. In the Central States cattle tend to be somewhat larger than they are in New England or the Deep South.

Defects Associated Largely with Eye Appeal

Most of the defects mentioned above as definitely functional affect also the eye appeal or acceptance of the animal. To these there might be added some other defects that have a minor, if any, relation to function. Examples of such are: (1) body color, (2) roughness over the topline, mildly sloping rump, (3) thinness and rough hair, especially in young females, (4) lack of barrel and depth of flank in a young cow with ample width and depth of chest, (5) coarse and badly shaped horns, (6) hip knocked down, blind in one eye, tail bone broken, and crooked wry tail, etc.

Many of these defects would reduce the sale value of the animal quite materially. Some, notably three or four, could probably be corrected with proper management, and they will be discussed later. In general, it may be said that a defect of this character bears a resemblance to a tiny flaw in a diamond, which cannot be seen with the naked eye. With such a defect the diamond is no longer perfect and must be sold at a reduced price although its brilliance and appearance may not be impaired. Cows with defects of this character are also not perfect, and, although they may be functionally sound, like the diamond, because of their defects they lose some, perhaps a considerable amount, of their dollar value.

Defects in Cows and the Aging Process

There is another classification of defects that bears an extremely important relation to judging. Because of this, defects should be separated into three groups: (1) defects that improve in the aging process, (2) defects that grow worse as the animal ages, and (3) characteristics that change very little as the animal grows older.

An understanding of the behavior of the characteristics or defects in each of these groups or categories can be of great value to a dairy cattle breeder or dairyman.

DEFECTS THAT IMPROVE IN THE AGING PROCESS

Certain rather definite and predictable changes take place in the characteristics of an animal as it develops to maturity. Some of

the defects observed in early life may in the course of development, if management practices are favorable, be partially or even completely overcome Naturally, defects of this character in a young animal are not as serious or harmful as defects that grow worse with age, or those that are not much changed by development The ability to correctly assay those defects in a cow or heifer that may or do improve with maturity is a highly valued judging accomplishment in a breeder To acquire such competence, it is essential to take careful note of weaknesses and study their progress in the developing animal

1 *A lack of depth of barrel in a young cow* Depth and width of chest are determined by bone structure The relative size and shape of the thoracic cavity are, therefore, determined by the skeleton and thus do not change except in size as the skeleton enlarges or grows Thus a narrow weak chest continues to be narrow and weak when the animal matures In such an animal the probability that the body will deepen relatively more than the chest is unlikely, and it should not be assumed that an immature animal with both these weaknesses will markedly overcome either at maturity

On the other hand, if the rib structure shows good depth and width, and the animal displays a rugged appearance accompanied by head width and muzzle strength but lacks in depth of body and letdown of the rear flank, prospects for improvement are much better The barrel is not encased in a bony structure, it can and does enlarge as the digestive organs distend and develop Such development is usually accomplished in an animal if it possesses a good appetite, especially if it is a good roughage eater Thus the deep, full chested young animal that lacks body depth is a good prospect for improvement in barrel development With the enlargement of the digestive tract, TDN intake is greater, and the production potential improved along with the eye appeal

2 *A moderate slope of rump* In Chapter 5 the bony structure of the rump was discussed, and it was mentioned then that, as the hip bones were lowered, which might be accomplished by an increase in the development and weight of rear body or barrel, the pinbones would be raised almost the same amount This fact is especially important in the eye appeal of an animal Thus it may be stated that a young animal, heifer or young cow, that possesses a full broad, and somewhat roached loin and pinbones considerably lower than the hooks—if the tail setting is smooth and snug

and pinbones are fairly wide apart—will improve in loin and rump as she becomes older. This quality in an animal was clearly demonstrated by the following incident. At the Wisconsin State Fair a number of years ago, a two-year-old Guernsey heifer was exhibited which possessed an arched loin and quite a badly sloping rump. She had a beautifully shaped udder and otherwise a desirable conformation. Charles L. Hill, then president of the American Guernsey Cattle Club, was observing the judging from the ringside, and, as the class was led out, he addressed the judge as follows: "What prospects do you think that heifer has for improvement?" The judge replied, "I think they are very good." Mr. Hill added, "I think that heifer will come down in the loin and level up her rump, and that by the time she is a four-year old she will be a truly great one." Mr. Hill's judging ability was sustained because the next year this same heifer was first prize three-year-old at the National Dairy Show in an especially strong class.

3. An udder of good texture and excellent shape but lacking in size: Functionally, the most acceptable udder is one that is attached firmly to the body, has excellent texture, and is average or slightly below average in size. Beyond this there is the matter of udder shape, teat placement, teat shape and size, and the over-all balance between the halves and quarters. These points were emphasized in Chapter 11, but it was not sufficiently stressed then that there is in many instances a probable potential development in the small, well-shaped udder.

Few persons have given thought to the significance of some of the more recent studies made upon the mammary system. We have always known, for example, that there was a considerable increase in the yield of milk from the first to the second and from the second to the third lactation of a heifer. What we did not recognize was that such increased production could be accounted for by the added growth of mammary tissue. All parts of the animal grow in essentially the same proportion. Therefore, the udder and the mammary tissue develop along with the increase in the size and weight of the animal. Furthermore, slow-maturing animals continue to grow for a longer period of time than early- or average-maturing ones. Thus, a small and good-textured udder on a heifer that has good dairy qualities and develops slowly will grow much larger and last for more lactations. If this same situation obtained, as it does, in an oversized heifer udder, imagine what would be the probable development in size, shape, and attachments of udder when the animal reached maturity. We find that func-

tionally such large udders are much less durable, do not milk out as readily, are much more subject to mechanical injury, and are less desirable for retention in the herd.

In short, the heifer or animal with the relatively small, good-textured udder that is tucked up close to the body has the best prospect for a long and useful productive life.

4. A strong back, especially in the loin region: If the lateral spinal processes are relatively long, this, as you previously learned, insures a fairly wide loin, and, if a loin of that character roaches without a high prominence in the middle of the back in a young animal, it is probable that the loin will level out and the topline become relatively straight when the animal reaches maturity. If, however, the roach is in the middle of the back, and especially if the spinal processes extend from two to three inches upward at the midpoint of the back, the prospects for improvement are not favorable.

Figure 13.3 pictures a well-developed, young heifer that possesses the loin and rump conformation that is expected to ultimately (at 2 to 4 years of age) develop into a level topline.

Perhaps we should, at this point, explain why the anatomy or form changes that produce this improvement normally take place. Figure 13.4 portrays a good cow upon which is indicated by symbols the location of the three principal muscles that provide the main support of the barrel or body of the cow.[1]

The skeleton, of course, provides the anchorage or points of attachment for these muscles. The three muscles referred to are: (1) obliquus abdominis externus, (2) obliquus abdominis internus, and (3) deep pectoral muscle.

With growth and development, the weight of the body increases. This added weight places more tension on the supporting muscles. For example, the obliquus abdominis externus is firmly anchored to the ribs, and fans out over the side and lower part of the barrel with a rear anchorage to the hook bone. Thus, as the animal deepens, greater tension is placed upon the hook bone which lowers it, and thus raises correspondingly the pinbone. This tends to level the slope of the rump. Similarly, the obliquus abdominis internus has its upper anchorage on the spinal processes that form the loin. It also fans out over the side of the barrel but beneath the externus muscle. As the added tension is applied, it follows the lowering of the barrel and thus pulls down the loin.

[1] Septimus Sisson, *The Anatomy of the Domestic Animals*, 4th ed., revised by J D Grossman, W B Saunders Co, *Philadelphia, 1953*

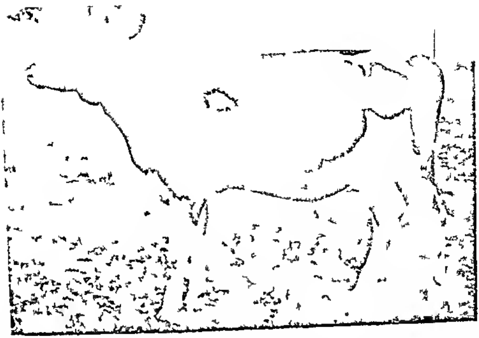


Fig 13 3 This heifer calf possesses the type of loin and rump that is expected to improve as the animal develops This animal should have an excellent topline and rump when she becomes a mature cow

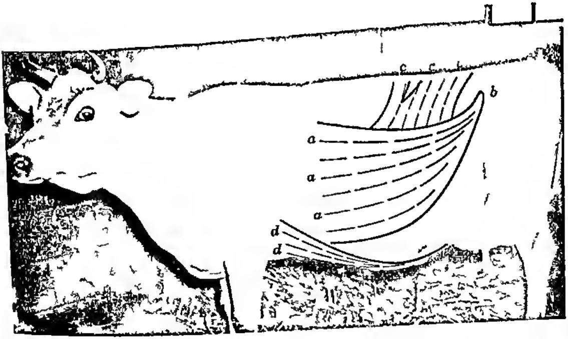


Fig 13 4 Pictures an outstanding Jersey cow with the location of three muscles largely responsible for the support of the barrel of the cow roughly indicated a shows the approximate location of the forward attachment of the obliquus abdominis externus muscle b shows the rear or hook bone attachment of the same muscle c indicates the loin or upper anchorage of the obliquus abdominis internus muscle The lower anchorage is more extensive and beneath the former or externus muscle d shows the forward attachment of the deep pectoral muscle which extends along the belly of the cow to a point above the udder

The third muscle, the deep pectoral muscle, is firmly anchored to the lower rib structure just back of the fore leg It extends along the lower part of the barrel and provides strength and sup port to this area of the body

5 *A slight deficiency of fore udder in a young cow* In Chapter 11, udder development and udder shape were thoroughly discussed You, therefore, know that the rear udder if supported high and wide by its rear attachment holds the same general position throughout its productive life It is, accordingly, only when the attachments fail, which is infrequent, that the rear udder lets down

The fore udder relies solely on abdominal support The median suspensory ligament is anchored to the floor of the abdomen and lowers as the body of the animal develops The lateral support also has abdominal anchorage, and likewise lowers as the body of the animal deepens and enlarges In this way, a situation is cre ated that tends to permit the fore udder to lower while the rear udder essentially maintains its original position The result is that the floor of the udder becomes more nearly parallel to the ground, and the rear udder is pushed back slightly further between the hind legs where it should be

CHARACTERISTICS THAT GROW WORSE IN THE AGING PROCESS

There are certain characters that are of such a nature that they continue to grow worse as the animal matures Such defects are, therefore, of a serious nature and often shorten the productive life of an animal They are more often than not manifest in the form of a weakness or failure of some functional part of the individual Many of the defects that appear in this category are heritable Thus they become a problem for the dairy cattle breeder, the ar tificial insemination association, and the dairy farmer

1 *A weak back and loin* This is usually a conformational weak ness Under certain nutritional deficiencies, especially if the ration is lacking in minerals and certain vitamins the condition may be materially worsened Unless this defect is accompanied with other more serious weaknesses, it is seldom that a weak topline alone presents any serious functional problems It practically never im proves, and, as the animal fills out and deepens in body, the top-line sags more and more It matters little whether the loin area

is most involved or the entire back area is included, the defect very seriously impairs the eye appeal of the animal. The more pronounced it is, the more this defect reduces the value of the individual. Because of this, a severe case of it frequently hasten the removal of an animal from the herd.

2. *Poor udder attachments with poor udder texture*: It has already been pointed out in Chapter 11 that poor udder attachments may be the result of inheritance, poor management, or both. Almost without exception this condition becomes worse with each new lactation of the animal. Probably more cows are sold from the herd because of an udder failure of some sort than for any other conformational defect.

Of all udder support failures, that of the median suspensory ligament is probably the worst. It is this failure that permits the sole or bottom of the udder to drop down and the teats to point outward. Furthermore, the condition becomes progressively worse and interferes with the milking process. Such udders hang very low, when the defect is pronounced, and thus become a prey to invading bacteria. Families of cows with this defect common to them seldom leave progeny in the herd that have any abiding value.

Among the common udder defects pointed out in Chapter 11 is one that involves the separation of one or both fore quarters from the body. This udder defect happens most frequently between the first and second lactations. Actually the condition that often causes the weakening of the lateral ligaments is an overdevelopment, excessive edema, before first calving. In some cases and in some breeds, this is severe enough to cause a fore quarter or quarters to show the lateral support loosening up or the fore quarter dropping down after the edema has left the udder. But more often the condition is noted when the udder proliferates and the accompanying swelling subsides following second calving.

An udder with this type of defect may remain functionally effective for several lactations if the median support is not involved and if the teats continue to hang straight down. The eye appeal of the animal is greatly and adversely affected by it, and the breeding value is reduced by the defect. Usually for one reason or another it shortens the period that the animal is retained in the herd. Figure 13.5 illustrates a median suspensory ligament failure. Figure 13.6 compares two Guernsey udders. One shows highly desirable form and eye appeal whereas the other is highly undesirable. Study the legend beneath the figure.

Fg 13 5 It wos po nted out in chopter 11 thot o mid udder support failure is l kely to grow worse With each new lacto t on the floor of the udder drops lower and the teats po nt more d rectly outword nstead of downword as they should

3 *Open or wing shoulders* The articulation of the shoulder to the skeleton was discussed in Chapter 5 The wing shoulder defect is one that grows progressively worse as the animal grows older In the early stages, the condition may not be noticeable except when the animal turns or stands at ease In the more advanced stages,

Fg 13 6 Th s photograph shows a contrast in shape and des rab l ty of udder The cow in the foreground has an udder of excellent form It has a h gh and w de rear ottochment strong forwo d attochment and good teat placement Controst th s udder w th that shown on the cow sl ghtly behind and to the left Th s udder hangs deep much too deep it is below the hocks The reor attachment is narrow and low ond the front attachment s somewhat broken awoy from the body The udder has too much depth ond lacks length from front to rear The teats are not well placed on the udder and they are undes roble in s ze and shape

it is easily recognizable at all times and then becomes of functional importance. Animals with badly winged shoulders are reluctant to walk to and from pasture or to cover much area when actually grazing. Figure 13.7 shows a cow with badly winged shoulders. Breeders of purebred cattle do not wish to perpetuate this character. The defect always reduces the eye appeal and value of an animal that possesses it.

4. ***Crooked hind legs, weak posterns, bad feet, and undesirable leg conformation:*** This defect perhaps more than most others is a matter of relativity. In other words, the condition may be minor or so severe that it causes the animal to be eliminated from the herd. In the more severe stages leg defects tend to interfere with the normal function of milk production. Certainly, in the more serious cases, the condition tends to become progressively worse as the animal ages.

It should be mentioned here that management is an important factor in the handling of defects of this sort, especially as they re-

Fig 13 7 This photograph illustrates a very bad case of wing shoulders. In this front view it shows clearly that the shoulder points have separated several inches from the skeleton The condition grows worse as the animal ages Within a few months after this picture was taken, the cow was sold for slaughter.

late to feet. Shaping the feet properly by regular and correct trimming aids greatly in slowing down the progress of leg defects. Furthermore, continuous stabling on concrete platforms with limited exercise during the winter period definitely hastens the breakdown of legs, pasterns, and feet. Rough, rocky, even mountainous pastures are extremely hard on feet and legs. A genetic tendency toward weak legs and feet tends to be self-eliminating under such rigorous conditions, because badly afflicted animals do not remain in the herd long enough to have many progeny.

Perhaps the most effective method of identifying the degree of leg weakness is to portray them in animals. Figure 13.8 portrays a desirable conformation in legs, pasterns, and feet. Figure 13.9 shows a cow with legs that are both sickle and cow hocked. In this cow the legs are sufficiently defective to be badly faulted from the eye-appeal point of view and to cause the cow considerable trouble in going to and from pasture and in the barn in winter. Figure 13.10 shows legs and feet so badly defective that it was necessary to sell the cow for beef. Figure 13.11 illustrates the serious and hereditary nature of this leg problem The three cows shown represent three generations with the granddam shown on the left. The photograph was taken just before these cows were loaded on the truck to be sold for beef.

5. The graying tendency in Holsteins: Occasionally a Holstein calf is born with an admixture of white and black hairs, causing the animal to appear gray. This condition in the calf bars registration. More often, however, the condition develops after the animal has been registered. In this character the tendency is for the white hairs to become more numerous and the black hairs more sparse as the animal grows older. The defect is nonfunctional in nature but does reduce the eye appeal and to some extent the value of the animal.

CHARACTERISTICS THAT CHANGE BUT LITTLE AS THE ANIMAL AGES

There is a rather large group of defects that are not influenced in the aging process. Some of these involve the skeleton; others are associated with physiological processes. Among the defects of this character we find

1. Head shape: The head, a bony structure, does not change its form greatly in the development of an animal. An undesirable head remains undesirable throughout the life of the animal.

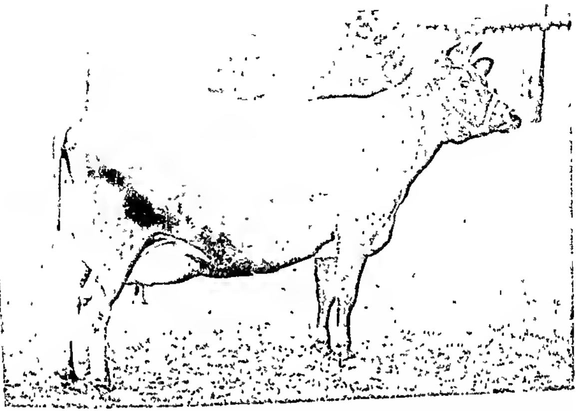


Fig. 13.8 This cow has a good flat bone, shows no puffiness at the joints, stands well on her pasterns, and has about the proper set to her legs. She is neither too straight in legs nor is she sickle or cow hocked. (Courtesy Prof. E. E. Ormiston, University of Illinois.)

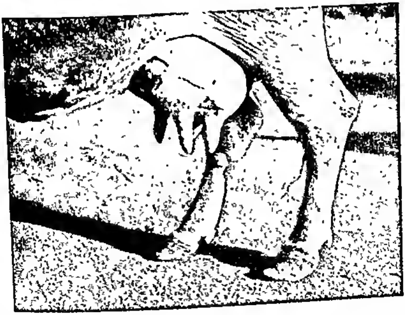


Fig. 13.9 The cow portrayed here is both sickle and cow hocked. Both defects tend to grow worse as the animal ages. In this case they were bad enough to reduce the value and effectiveness of the cow.

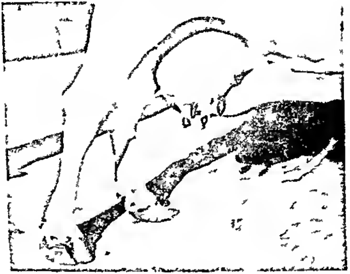


Fig 13 10 This cow was so defective in legs that she would not go out to pasture Shortly after this p cture was taken this otherwise desirable cow was sold for beef

2 *Depth and fullness of chest* The thoracic cavity which houses the heart and lungs is almost entirely surrounded hy hone The backbone, ribs, and sternum form a rigid chest that takes its gen eral form at an early age and then enlarges as the animal grows If the chest is narrow and lacking in depth, it is very likely to remain so This particular weakness is regarded as important in

Fig 13 11 This group of cows represents three generations The mother, daughter, and granddaughter all have extremely crooked hind legs They illustrate that the defect is heritable It is a type of weakness that is d fficult to eradicate from a herd

dairy cattle because it is so closely linked with general capacity. A weak-chested animal seldom has a good well-developed body and usually lacks vigor and the ability to use large amounts of feed. Such animals, if well fortified with dairy qualities and lactation drive, cannot consume enough feed to yield as well as their more rugged stable mates.

3. *Pelvic arch except slope of rump:* The shape of the pelvic region is determined by a bony structure. If the rump is short and the bony processes give an unpleasing appearance to the animal, it is not expected that there will be a great deal of change as the animal matures. Figure 13.12 portrays a cow with a highly undesirable rump. This cow although a capable producer lacks eye appeal. This defect is not definitely correlated with productive ability, but it does detract from the appearance of the animal and reduces its value in comparison with an animal such as the one pictured in Figure 13.13.

4. *Lactation drive or dairy tendency:* It has already been pointed out that lactation drive or dairy tendency is genetic in origin, and each parent contributes essentially equally to the character. The quality does not change with maturity. The change in actual production from lactation to lactation is brought about by the reaction of the animal to its environment. Even though an animal does not have an opportunity to demonstrate its real inheritance, it can still transmit its full ability to its progeny.

5. *Wry tail, undershot jaw, wry face, etc.:* Defects of this character usually involve bone structure, and they do not change greatly during growth and development. All are heritable and recessive in transmission, and they should be recognized not so much as affecting function, although in extreme cases they may do so, but rather as undesirable with a tendency to reduce the value of an animal.

6. *Condition, fleshing, bloom, and stage of lactation:* The most important variable in herd classification does not lie in differences in judgment between classifiers, as many suppose, but in the stage of lactation of the cow at time of classification. This fact has been demonstrated experimentally with the Reymann Memorial Herd[2] at West Virginia University, Morgantown, West Virginia, and in

[2] George Hyatt Jr. and W. J. Tyler, Variations in Type Ratings of Individual Ayrshire Cows, *J. Dairy Sci.*, 31 71, 1948

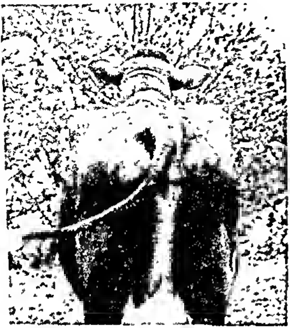


Fig. 13.12 This cow is mature, and yet her pinbones are 4 or 5 inches lower than her hooks. The pin bones are also narrow. The tail head is coarse, and the tail setting is wry to the right. The thurls are low, making the rump slope badly to the sides as well as to the rear.

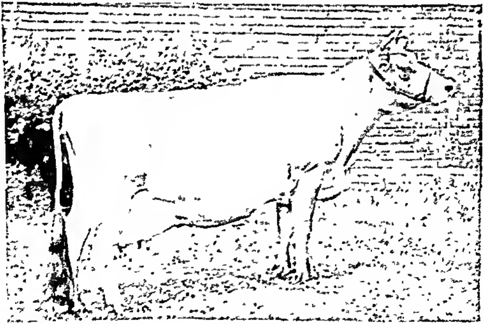


Fig. 13.13 This cow, Golden Jersey Star, possesses a highly desirable rump. Note that the pin bones are level with the hooks and that the rump is relatively level. The rump is both wide and long. The tail head shows quality and fits snugly between the pinbones. (Photo courtesy of Chester Folck).

other studies Stated in another way, there is more variation between classification ratings on the same cow by the same classifier at different stages of lactation (6-month intervals) than there is between different classifiers rating the same cow at essentially the same time, each without knowledge of the others rating (see Chapter 24)

Why is this true? Primarily because an animal in good flesh and springing up just before calving or in heavy flow of milk after calving has more evident capacity, more eye appeal, and better acceptance than the same animal has when she is milked down or almost dry A good judge of cattle recognizes this and buys cattle that do not appeal to the average buyer and relies on his ability as a breeder and caretaker to improve their appearance

It should be recognized, however, that these temporary changes in an animal do not affect, except in severe cases when growth is retarded, the productive level or basic value of the animal

Suggested Agreement on the Evaluation of Certain Defects

The Purebred Dairy Cattle Association and The American Dairy Science Association have approved the following procedures in judging

Dairy Cows

Eyes

1 Total blindness *Disqualification*

2 Blindness in one eye *Slight discrimination*

Wry Face

Serious discrimination

Parrot Jaw

Slight to serious discrimination

Shoulders

Winged *Slight to serious discrimination*

Capped Hip

Slight discrimination

Tail Setting

Wry tail or other abnormal tail settings *Slight to serious discrimination*

Legs and Feet

1 Lameness—apparently permanent and interfering with normal function *Disqualification*

Apparently temporary and not affecting normal function *Slight discrimination*

2 Bucked knees, blemished hocks crooked hind legs, weak pasterns *Serious discrimination*

3 Evidence of arthritis crampy hind leg *Serious discrimination*

4 Enlarged Knees *Slight discrimination*

Absence of Horns
No discrimination

Lack of Size
Slight to serious discrimination

Udder
1 One or more blind quarters *Disqualification*
2 Abnormal milk (bloody, clotted, watery) *Possibly disqualification A slight to serious defect*
3 Udder definitely broken away in attachment *Serious discrimination*
4 A weak udder attachment *Slight to serious discrimination*
5 One or more light quarters, hard spots in udder, side leak or obstruction in teat (spider) *Slight to serious discrimination*

Dry Cows
In case of cows of apparently equal merit *Give preference to cows in milk*

Overconditioned
Serious discrimination

Temporary or Minor Injuries
Blemishes or injuries of a temporary character not affecting animal's usefulness *Slight discrimination*

Evidence of Sharp Practice
1 Animals showing signs of having been operated upon or tampered with for the purpose of concealing faults in conformation, or with intent to deceive relative to the animal's soundness *Disqualification*
2 Heifer calves showing evidence of having been milked, in an attempt to deceive regarding natural form of udder *Serious discrimination*

Bulls

Excluding reference to mammary system, the above evaluation of defects is the same for bulls, except that parrot jaw and winged shoulders incur serious discrimination Bulls with one testicle or with abnormal testicles—disqualification

By *disqualification*, it is meant that an animal is not eligible to win a prize Disqualified animals are not eligible to be shown in group classes A slight to serious discrimination is evaluated by the judge who determines what he deems to be a proper penalty

chapter **14**

The physical and morphological characteristics of the Ayrshire breed

If one is searching for a simple definition of a breed, he might be satisfied with: "A breed is a group of animals related by descent and similar in most characteristics." But, if he wishes to be more specific and embracing, he will be better satisfied with this definition: "A breed is composed of a group of animals developed through the influence of man, intentionally or unintentionally, and requiring the control by man to prevent contamination through a mixture with other races and thus the consequent loss of its distinctive qualities."

Each breed of dairy cattle possesses certain distinctive qualities that are commonly recognized as characteristic of that breed. These might be roughly divided into two categories: namely, (1) those of a superficial nature such as color, spotting, color pattern, type and size of horns, and (2) the more important physical and physiological characteristics such as size, body form, mammary system, head and neck character, lactation drive, milk yield, per cent fat content of milk.

It might not be out of place to add even a third influence: namely, the attitude of leading breeders and the breed associations toward the kind of animal that they consider would serve the best

interests of the breed This might involve selection pressures that would tend to change the breed in any direction desired For example, it might be their wish to increase the average size and weight of animal, or to improve life expectancy and durability, or perhaps to raise the average yield of milk, if necessary, at a sacrifice of the per cent fat content of the milk If such selection pressures were generally and persistently pursued by breeders, they would in time exert a considerable influence in changing the breed in the direction of the character or quality desired

General Characteristics of Ayrshire Form

In speaking of Ayrshire characteristics, or characteristics of any breed, it is desirable to have in mind animals of a certain age and sex Therefore the discussions in Chapters 14 to 19 inclusive, unless otherwise indicated, refer to mature cows Perhaps it is well to recall also, as has been pointed out in earlier chapters, that the basic characteristics, especially functional dairy qualities, are essentially the same for all breeds of dairy cattle That explains why the interbreed dairy cow and bull score cards were developed and accepted by the several breed associations and by the American Dairy Science Association However, such general agreement on basic or fundamental dairy qualities does not presume that the breeds themselves are necessarily alike They do, in fact, differ quite markedly in many respects

That which has been agreed upon by the several purebred dairy cattle breed associations and the American Dairy Science Association has to do only with the general points of similarity that are common to good dairy cattle, irrespective of breed These common characteristics embody such qualities as general conformation, capacity to utilize feed, a desirable mammary system, evidences of milkiness, etc Such qualities are identified primarily with the function of milk production We must be quick to recognize, however, that the breeds themselves possess many different and easily recognized identifiable qualities

Ayrshire Breed Character, Quality, and Conformation

The breed characteristics and the breeders' concept of type conformation is rather well established in the Ayrshire breed Figure 14 1 shows the outstanding cow, Alfalfa Farm Ann 2nd This picture portrays many of the characteristics that are associated with

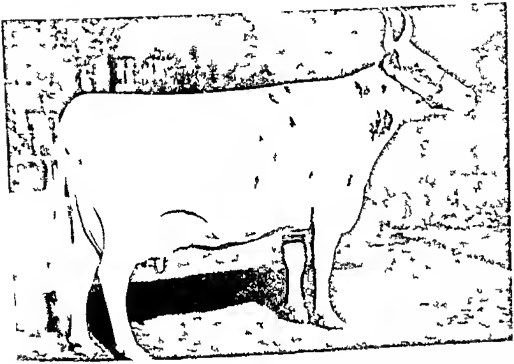


Fig 14 1 Alfalfa Farm Ann 2nd is regarded as an excellent specimen of Ayrshire type She has been many times grand champion n the show ring and she has demonstrated good production

the ideal Ayrshire cow She combines desirable conformation with the basic qualities of a good dairy cow that are clothed in the garb of an Ayrshire Figure 14 2 portrays another great Ayrshire cow, Iroquois Sally Winters She is somewhat more dairy like in form and shows slightly better Ayrshire character about the head and neck than Alfalfa Farm Ann 2nd To portray the ideal type of Ayrshire cow, the Ayrshire Breeders' Association has developed a three dimensional model Figure 14 3 is a photograph of that model which is intended to convey the breeder's view of what an Ayrshire cow ought to be

Please bear in mind that this is not a real cow It does not portray any living animal as Figures 14 1 and 14 2 do It is rather the sculptor's efforts to combine the various parts of the best Ayrshires into one composite animal The model thus produced is presumed to portray the ideal Ayrshire cow, and, if such a cow could be found, she would by conforming to the model be the most nearly perfect animal yet produced

If the model is accepted as the ideal, and there would be some disagreement on this point among breeders, then the ideal cow is rather short in body but very deep both in chest and barrel By comparison, she appears deeper and shorter than the two Ayrshire

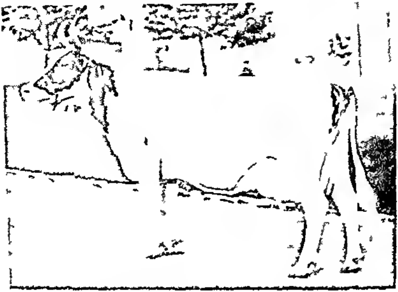


Fig 14 2 Slightly more dairy-like looking and almost equally desirable in conformation is the cow, Iroquois Sally Winters Note the excellent head neck, and splendid dairy quality of this cow

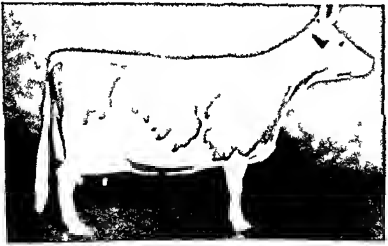


Fig 14 3 The model Ayrshire cow appears to be slightly deeper in chest and somewhat more compactly built than the two cows previously pictured Evidently Ayrshire breeders are seeking durability

cows in Figures 14.1 and 14.2. If one can draw conclusions from the "true type" model, Ayrshire breeders are desirous of developing depth and ruggedness in their dairy cows.

The best procedure to follow in studying the characteristics of any breed is to observe critically as many good animals of the breed as can be made available. But, in the absence of an opportunity to study living animals, breed models and photographs play an important role in establishing a concept of breed conformation and type.

DISTINCTIVE AYRSHIRE CHARACTERISTICS

The Ayrshire breed had its origin in Scotland and has to a considerable degree developed under that influence. Since it is a distinct breed, it possesses many characteristics that are peculiarly its own. These involve such attributes as color, type and conformation, horn size, length and to some extent shape, fleshing qualities, and udder form. The breed is stylish, and the best animals are very clean about the head and neck.

Color and color pattern: The Ayrshire is characterized as a spotted breed. But occasionally we find animals that are almost self-white, whereas, on the other hand, some possess the body color (some shade of red or mahogany to nearly black) almost to the complete exclusion of any white markings. In spotted animals, and most Ayrshires are spotted, the spots are not often as distinct in outline as are the spots of some other spotted dairy breeds, of which the Holstein-Friesian is perhaps the best example. The color patterns vary a great deal, and the amount of color other than white is likewise highly variable. When limited spotting does occur, the spots are usually found on the neck and shoulders. Even in almost self-white animals, there will almost always be some color on the neck, cheeks, or ears of the animal. The great majority of animals vary in color between the extremes of self-white on the one hand and self-color on the other.

Quite often animals show a splashing of color or an admixture of white and body color. Figure 14.4 shows a cow with this type of coloration. The cow pictured, South Farm Helen R., was a distinguished show winner at many leading shows. You will note that the spots on the side of this cow are extremely difficult to outline and that the skin shows flecks of color, especially on the rear flank, where the body color is white.

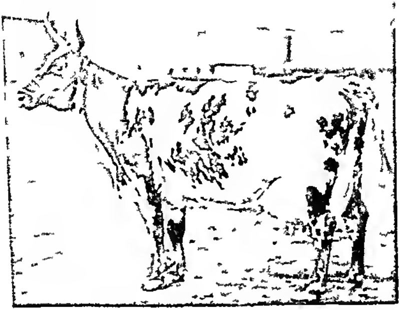


Fig 14 4 The cow, South Farm Helen R, displays a different coloring of the breed and clearly shows the splashing effect and indistinct outline of spots She is also a champion cow

It is not our intention to emphasize the importance, certainly not economic importance, of color in an animal but rather to show that great variation in color does exist in this breed There are personal preferences in color, of course, but in general, if an animal in any breed meets the color requirements for registration, the color, whatever it may be, is acceptable in the show ring and in the trade

Type and conformation The first two cows portrayed in this chapter (Figures 14 1 and 14 2) provide very good examples of Ayrshire type and highly desirable conformation. The model shown in Figure 14 3 further illustrates this point But, lest a false impression be gained concerning the qualities of a highly desirable cow of this breed, two additional cows portraying somewhat more capacity but less smoothness and perfection of form are presented Figures 14 5 and 14 6 illustrate excellent functional capacity with highly acceptable form. Figure 14 5 shows the cow Par's Red Shelia when quite well advanced in age This cow is classified excellent and has a lifetime production of 175,065 pounds milk and 7570 pounds fat She thus possesses the highly regarded qualities of high sustained high yield, excellent conformation and type, as well as great dura-

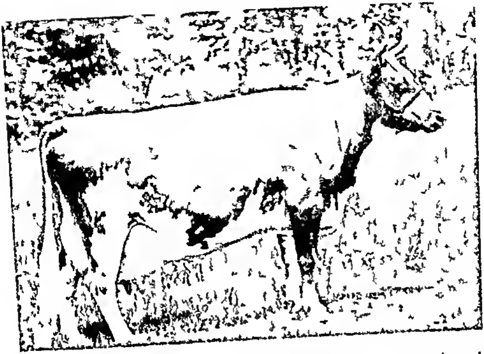


Fig 14 5 Par's Red Shelia shows the type of Ayrshire cow that displays durability She has excellent depth of chest and body, and her udder is attached snugly to the body She also displays heavy lifetime production

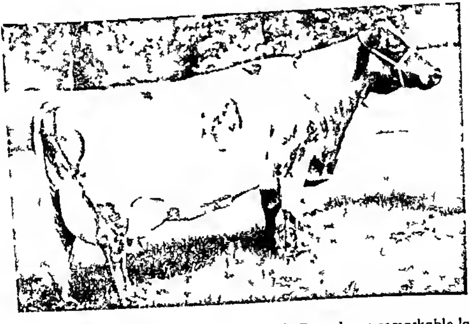


Fig 14 6 This cow Crusader's Joyce of Windy Top shows remarkable longevity This photograph was taken when the cow was in her 20th year She shows the qualities of a cow half her age This longevity is a cherished character in good dairy cows of all breeds

bility Figure 14 6 pictures the cow Crusader's Joyce of Windy Top which even more strikingly illustrates the qualities mentioned above For this cow has calved 15 times and has a lifetime production of 201,623 pounds milk and 8481 pounds butterfat The photograph shown was taken when this cow was in her 20th year of age The cow has a classification rating of very good

The five Ayrshire cows pictured in this chapter should enable the reader to form a concept of what the best cows in this breed look like and how they perform They are cows that show desirable Ayrshire character and display, at the same time, plenty of power at the pail They are the kind of cows that set the pattern and establish the standards for type and conformation by which tbe breed is gaged Functionally, they are highly effective In sbort, they provide the criteria for the formulation of a concept depicting a highly desirable Ayrshire cow These cows are, of course, among the better Ayrshire cows that are to be found anywhere and thus they provide the benchmarks from which deviations in type and conformation can and must be evaluated

Development cycle and sexual maturity The Ayrshire breed is approximately intermediate among the dairy breeds in rate of development and age at time of sexual maturity Certain strains and families vary considerably in the age at which they mature Usually those that mature more slowly possess somewhat more longevity and greater durability than those that mature at an early age or even at an average age Furthermore, other factors remaining the same, the later-maturing strains are somewhat more upstanding when young, grow for a longer period, and thus are somewhat larger at maturity than the average Ayrshire More breeders prefer the slower-maturing, larger, more durable animals and families

Slaughter qualities and acceptance for beef The first and most important function of a dairy cow is milk production But sooner or later after that function has been terminated, then the final use is for beef It does not matter whether sterility, low yield, accident, disease, or old age is responsible for the termination of production, at this point the slaughter qualities are mainly responsible for the salvage value of the animal The Ayrshire breed ranks at the very top among the breeds of dairy cattle in the quality of the carcass They also, if fat, dress out quite well when slaughtered

Ayrshire veal is of good quality and ranks well with the trade Steers of this breed feed out well and have good acceptance in the market The body fat is white, and the carcass looks well when

on the hook in the cooler. The rates of gain of steers are almost equal to those of steers of the beef breeds. The quality of the Ayrshire carcass, even when well fatted, and the dressing percentages are, however, considerably below those of the high-quality, well-fitted beef steer.

Style and carriage: The Ayrshire tends to be a proud breed. Among the better animals, the carriage is good, the head which usually has excellent shape is held high, and the animal walks with style and eye appeal. If the animal has horns, and most of the animals that are exhibited at major shows do, they are larger than the horns of other dairy breeds. They are shaped in characteristic fashion (note the horns in Figures 14.1 and 14.2) and provide a kind of trademark for the breed. It must be recognized that horns of this character provide a day-to-day hazard in the operation of a herd.

Points of Breeder Emphasis

Ayrshire breeders prefer their cows to be very clean and well chisled of feature in head with a rather long, lean neck that is free of thickness about the throat. This, Ayrshire breeders hold, is the region of the body where breed character is most likely to be displayed and where it should be rated.

They also place much emphasis upon durability. This, they contend, is associated with depth of chest and depth of barrel without too much length of barrel, and should be accompanied by evidence of ruggedness. The mammary system that shows evidence of holding up well is preferred. Udders do not have the extreme length, especially in front quarters, that was formerly prized, but they are expected to blend more smoothly into the body and have more crease between the two halves. The teats are longer and slightly larger in diameter than were those commonly observed on cows of some years ago.

Extreme lactation drive is less evident in many cows of this breed than in some other breeds. Ayrsbire cows have the ability to fleshen up readily in the later stages of their lactations.

chapter **15**

The physical and morphological characteristics of the Brown Swiss breed

In its native home, Switzerland, the 'Schwyzer breed' now known as Brown Swiss has retained its identity for as long as ten centuries It is, therefore, a very old breed, and its characteristics have been well established The breed is somewhat unique, in that in its homeland, a relatively few animals (5) are reported to have provided the foundation for the major portion of the breed Dr W Engeler,[1] Berne, Switzerland, speaking of the breed in its native home, reports that 90 per cent of the bulls recorded in the herd book can be traced back to some one of these five ancestors

The breed was first introduced into the United States by Henry M Clark of Belmont, Massachusetts, in the autumn of 1869 This first importation consisted of one bull and seven females The bull, William Tell, was the first bull registered in the Brown Swiss record The females, Zurich, Lucerne, Gretchen, Brinlie, Lissa, Christene, and Geneva were the first females recorded, and they were registered in the order given In all, approximately 25 bulls and 130 females were imported to the United States from Switzerland

[1] Dr W Engeler *Brown Swiss Cattle* The Commission of Swiss Cattle Breeding Associations Berne Switzerland 1937 1938

Approximately 450,000 animals have been developed and recorded from this foundation.

The Brown Swiss Cattle Breeders' Association was organized September 8, 1880, in the office of I. N. Keyes, Worchester, Massachusetts. The first herd book was authorized at the annual meeting of the association in 1888. It is of interest to note that the first official score card for the breed was published in the first edition of the *Brown Swiss Record*. This original score card was agreed upon in 1889, and was first revised in 1912. The second revision came in 1930. Then, in 1937, Fred Idtse, secretary, and Oliver Bower, a director, again revised the score card, which was modified only slightly to comply with the Purebred Dairy Cattle Association score card, copyrighted in 1943 and approved by the American Dairy Science Association the same year.

GENERAL PHYSICAL CHARACTERISTICS OF THE BROWN SWISS BREED

Brown Swiss are large, brown-colored cattle that appeal to Corn Belt farmers and dairymen who want size and ruggedness with good dairy qualities. The heavy muscling and stockier build of this breed, together with the ability to consume large quantities of feed and thus to fatten easily when dry, have characterized Brown Swiss. To obtain these qualities it was, of course, necessary to yield somewhat in the appearance of lactation drive, clean-cutness about the throat and dewlap, sharpness at the shoulders, and quality of bone.

With these physical qualities, it might be assumed that Brown Swiss would be lacking in persistency of production: that they would yield well in the first few months of their lactation, as animals lacking in many of the qualities most often associated with lactation drive do, but in the later months would decline rapidly from month to month in production. This is definitely not the case. For this breed is as persistent in production, as likely to produce more in the tenth month of lactation than it did in the first, as is any breed of dairy cattle.

Color and color pattern: The Brown Swiss is a self-colored or solid-colored breed. Occasionally spots of white or near-white are located on the belly of an animal. The presence of any white or "off-color spot" is deemed undesirable in the breed. The view of the Brown Swiss Cattle Breeders' Association on this point is indi-

cated by the following statements taken verbatum from the Application for Register forms of the Association

> Any bull having a sharply contrasting off color spot or spots, or having a white core in the switch, shall have its registration certificate prominently stamped with the words, "Off Color Spot, this animal does not meet the color standards of the Brown Swiss breed."
>
> Any female having sharply contrasting off color spot, or spots, above the underside of the belly, or above the udder, or the floor of the chest, or having a white core in the switch, shall have its registration certificate prominently stamped "Off Color Spot, this animal does not meet the color standards of the Brown Swiss Breed"
>
> If a spot, or spots, develop on an animal after it has been registered it shall be the obligation of the owner to send the registration certificate to the Brown Swiss office to be stamped with the designation "Off Color Spot"
>
> The characteristic mealy band around the muzzle, the light colored line up the back, and light area around the poll and horns shall not be considered an "Off Color Spot."

Most Brown Swiss animals have a band of light-colored hair around the muzzle. Fewer, but a considerable number, have a light-colored (lighter than the body color) line along the back, on the poll, or around the horns These lighter areas are not looked upon unfavorably but rather as a common characteristic of the breed

Brown Swiss tend to differ in color at different ages and during the different seasons of the year. At birth, Brown Swiss calves are very light brown in color but darken as they grow older. In older animals, during the summer the shade of brown lightens up markedly In the winter, the brown becomes much deeper in hue In some animals at this stage the color is a very deep chocolate brown or almost black Temperature also influences coat color, especially in this breed Brody in the Missouri Climatic Laboratory found that animals subjected to extreme cold (even in the summer months), as the hair grew out for protection, became much darker in color

Development cycle and sexual maturity: Of the five major breeds of dairy cattle, the Brown Swiss is the latest to reach sexual maturity and full physical development The studies of Professor W. L Gaines showed that a Brown Swiss cow is six months slower in reaching maturity than the average of the dairy breeds Stated another way, a Brown Swiss heifer reaches approximately the same

stage in her physical development when she is two years and six months of age that a Holstein attains at two years of age. To achieve the same relative development that a Jersey possesses at two years of age, she would need to be two years, nine and one-half months of age.

In dairy cattle, the later or slower-maturing animals are usually more durable and possess a longer life span than early-maturing animals. This tendency toward longevity is a quality of the Brown Swiss breed. The cows have a younger, more vigorous look about them when they are 12 to 14 years of age than cows of the same age of other dairy breeds. Because of this slower maturity, it is desirable that heifers be older when first served. Most breeders prefer that heifers be 20 to 24 months (depending on size) when first served, and that they calve from two years and five months to two years and nine months of age.

Feed intake and roughage consumption capacity: As a breed, Brown Swiss are large animals; by comparison they rank second in size to the Holstein breed. The perpetuation of size or scale is one of the current objectives of the National Association. This over-all size provides animals of this breed with excellent capacity to handle feed in quantity. Their large, roomy bodies enable them to handle large amounts of roughage. The cow Illini Nellie while milking from 100 to 106 pounds of milk per day never consumed more than 16.5 pounds of grain or concentrates daily. Most of the nutrients required by her were obtained in some form of roughage.

The mammary system: In comparison with the other dairy breeds, Brown Swiss udders rate very high in texture or quality. In shape or form of udder, especially before the last 10 to 15 years, the breed was to be severely criticized. Too frequently the udder was badly quartered, the teats were poorly placed on the udder, were very long, especially the front teats, and the rear attachment of the udder was often narrow and low. It should be mentioned, however, that, from a functional point of view, Brown Swiss udders were very durable. During the past 15 years, Brown Swiss breeders have done much to improve the shape and eye appeal of the mammary systems of their cows.

Slaughter value and acceptance for beef: The large size, the rather stocky build, and the ease with which Brown Swiss take on condition have caused this breed to rank high among dairy breeds in carcass value. Being large and heavily fleshed animals, they bone

out with a minimum amount of labor The body fat is light in color, and the meat, although slightly coarse in texture, is well received

Brown Swiss calves are the largest in size at birth (average 100 lb or more) of any breed of cattle They grow rapidly and take on fat readily Thus they are highly desirable for the veal market, an item of greater importance since artificial insemination has been extensively used

Docility, style, and carriage Brown Swiss are a docile, quiet breed Their movements are usually slow and measured They do not lead and handle as readily as most of the dairy breeds They could not be classed as a stylish breed for they lack the alertness and carriage associated with this quality They give the impression of solidity and stoutness but lack somewhat in eye appeal

Brown Swiss bulls used in upgrading In certain sections of the United States, Brown Swiss bulls are used extensively for grading up smaller, less capable grade and scrub dairy cattle The genetic qualities of the breed are such that the first generation, being self-colored and similar in color and type to the Swiss, resemble the male parent very closely The cows resulting from these matings are also distinctly superior to their dams in production This program has worked successfully because the birth weight of a calf is determined very largely by the maternal influence Thus the rather great difference in genetic size between the sire and dam in these instances has not resulted in serious calving problems

Breed Improvement and Public Acceptance

Great progress has been made in improving the type and physical characteristics of Brown Swiss in the last quarter of a century The extreme roughness of the 1910 s and 1920 s, the poorly shaped mammary systems, and the lack of eye appeal noted then have now given way to a vastly different animal. The animals are much smoother, the udders are more symmetrical, the teats are better placed and more desirable in size than they were then, and yet the over all size and production of the animals has been, for the most part, retained or improved These points are well illustrated by the panel of three grand champion cows at the 1910, 1912, and 1913 National Dairy Shows These cows are pictured in Figure 15 1 Compare these cows with those shown in the next panel, Figure 15 2 These cows were the grand champions at the 1954,

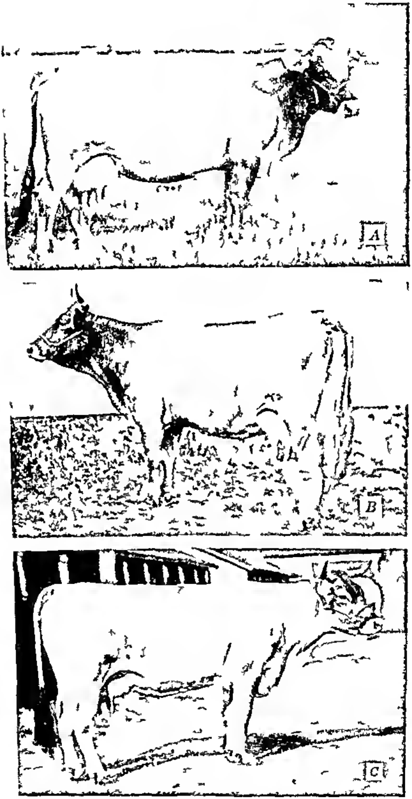


Fig. 15.1 This is a panel showing the grand champion Brown Swiss cows at the 1910–1912 and 1913 National Dairy Shows. The cows are A—Iowa Lassie, B—My One Baby, C—Belle of Grattan. *These cows, although rugged animals that show evidence* of production, lack the smoothness, type, and mammary systems expected of present day Brown Swiss.

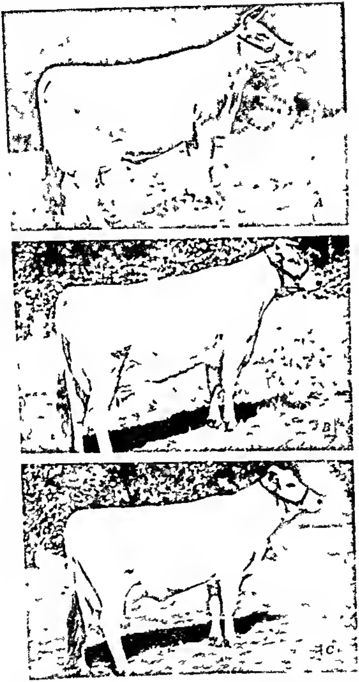


Fig 15 2 Contrast these three cows with those of the previous panel These are the grand champion cows at the 1954–1955 and 1956 National Breed Shows The cows are A—Lee's Hill Ski Lady R B—Lee's Hill Mildew M and C—Lee's Hill Memoir A. These cows are smooth high-quality, and excellent uddered animals Their type is vastly improved over that of the early cows of the breed

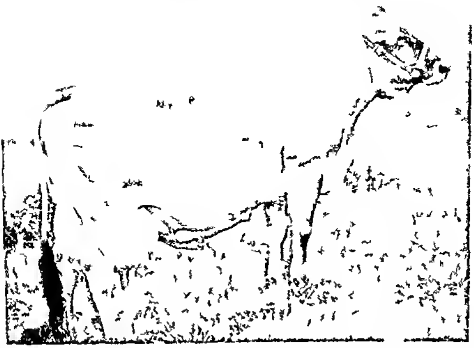


Fig 15 3 The highest butterfat production achieved by any cow regardless of breed up to August 1 1957 was made by this rugged Brown Swiss cow Active Acres Bessie Her record is 31,166 lb milk and 1544 17 lb fat She has been classified excellent and demonstrates enormous productive capacity

1955, and 1956 National Dairy Breed Shows Brown Swiss breeders have exerted a great and beneficial influence upon the type and form of their cattle, perhaps more than that noted for any other breed of dairy cattle during the same period

Geographical Distribution of Brown Swiss Cattle

The greatest concentration of Brown Swiss cattle in the United States is found in the fertile regions of the Central States The characteristics of the breed have appealed to dairymen who reside in the Corn Belt and adjoining states These dairymen have ample feed and prefer a large animal that yields a good quantity of milk and has a good carcass value

By no means, however, is the breed confined to this area It is found quite generally distributed throughout the United States More recently, a demand for Brown Swiss has developed in foreign countries Cuba and South American countries are now importing from the United States Brown Swiss heifers and bulls in considerable numbers

chapter **16**

The physical and morphological characteristics of the Guernsey breed

The first importation of Guernseys that remained pure and thereby exerted any influence on the breed in the United States occurred in 1830 Subsequently, relatively small numbers were imported from the Island or England until about 1895, after which for the next 40 years animals were brought to our shores in rather large numbers For example, in 1905, 258 head were imported. In 1911, 862 animals entered our ports, in 1913, 1058, and in 1914, 1042 were brought into the United States After 1914 the importations were reduced in numbers but continued fairly regularly until about 1930, after which they were sporadic and of little importance to the breed.

The native home of the Guernsey breed is a tiny bit of land of some 24 square miles in area, known as the Island of Guernsey A much smaller island, Alderney, has also had a minor influence in shaping Guernsey type and size in the United States The Island of Guernsey is located in the English Channel some 22 miles from the somewhat larger Island of Jersey It is only natural that, since these two channel islands are near each other, and isolated to some extent from the mainland and the British Isles, their cattle would be much alike In fact, they were very similar until each island became closed by legislation

In 1789 the authorities on the Island of Jersey passed a law that no cattle could be brought to the island except for slaughter. In 1819 the governing body of the Island of Guernsey passed similar legislation. What these laws did was to close these islands against outside breeding influences. Thus each island operated its breeding program as a vast closed herd. As a result, the differences that now exist between the cattle of Jersey and Guernsey have been brought about by the objectives and goals of the two groups of breeders.

Although there are easily recognizable differences in both the physical and physiological qualities of Jersey and Guernsey cattle, there are also well marked similarities. Both breeds, for example, are relatively small in size. Their milk is highly colored, especially the Guernsey, and rich in butterfat. The nonfat solids are likewise high in the milk of both breeds.

GENERAL PHYSICAL CHARACTERISTICS OF THE GUERNSEY BREED

If one were to choose from among the major breeds of dairy cattle that breed which displays the highest degree of variability in physical conformation, it would probably be the Guernsey breed. The rather marked differences between animals within this breed provides the breeder with a large bank of germ plasm to choose from, but it also assures him of a more highly variable herd to look at.

Geographical distribution of the Guernsey breed: The characteristics of the breed have given it a wide general appeal. There are not so many points of high concentration of animals of this breed as there are of other breeds, but no breed has wider distribution. This wide general acceptance would indicate that the breed has a high degree of adaptability. It stands cold well and heat better than most breeds. Perhaps to a greater degree than any other breed, Guernseys currently appeal to highly successful business and professional men who have a particular urge to breed dairy cattle.

Color and color variations in Guernseys: The breed is spotted. The predominant body color is a golden or reddish fawn with white markings. The line of demarkation between the body color and white is relatively distinct. Occasionally the white areas are not really white, but are flecked with body color. There is no preva-

lent color pattern except that most animals have more or less white on the underline, white markings on the legs, and a white switch. More often than not there is a white spot in the forehead

The unhaired portions of the body are light or pinkish in color and are thus in contrast with the Jersey which is near black. In fact this difference provides a relatively reliable means of distinguishing between a few animals of the two breeds that are otherwise difficult to identify as to breed Occasionally, but not often, animals are almost completely self colored The shades of color may vary from a light lemon colored fawn to a very deep mahogany red

Closely allied to body color and formerly given much emphasis in the breed are skin pigmentation and skin secretions When Guernsey calves are born, very little skin secretion is observed. After they have consumed green grass or carotene bearing feeds, the secretions begin to appear These secretions are readily observed inside the ear, around the eyes, on the udder, and near the end of the tail bone Professor L S Palmer,[1] 1914, was the first to demonstrate that the yellow color of the fat of milk, skin secretions, and body fat was due to the presence of a yellow pigment in the substance carotene which is derived from the chlorophyll of plants.

The reason that the milk of the Guernsey, her body fat, and skin secretions are a richer yellow color than that found in the other breeds is due to her inability to convert as high a percentage of the carotene she consumes into vitamin A Vitamin A is almost colorless, whereas carotene is yellow, and much of the carotene not converted goes directly into the milk, body fat, or skin secretions It should be stressed that, currently, in the Guernsey breed, very little if any emphasis is placed either upon the abundance of or the rich yellow color of the skin secretions They do, of course, continue to emphasize the golden yellow (Golden Guernsey) color of the milk.

GUERNSEY BREED CHARACTER AND CONFORMATION

Breed character is a somewhat general term used to describe the particular qualities associated with a breed and by which it is differentiated from other breeds. These differences may be either

[1] L. S. Palmer and C H. Eckles, The Principal Natural Color Pigment in Milk Fat, *J Biochem.* 18 191 1914

physical or physiological. It is the former that we are discussing in this chapter.

Development cycle and sexual maturity: Relatively, the Guernsey breed is early-maturing. It reaches sexual maturity and full development at a slightly older age than the Jersey, the breed discussed in Chapter 18. The difference between the Jersey, earliest to develop, and the Guernsey is approximately 1.5 months. The Holstein breed develops about 2.4 months later than the Guernsey. Well-grown Guernsey heifers may be first served when they are from 16 to 18 months of age.

When fully matured, Guernsey bulls and cows are considerably larger than Jerseys of the same sex. A desirable weight for mature Guernsey cows in milk is 1050 to 1200 pounds. Mature bulls should weigh from 1600 to 1800 pounds. In general, animals that are somewhat above average size, other factors remaining the same, are favored by breeders.

Style and carriage: In these qualities the Guernsey breed would be rated average among the dairy breeds. It is not the equal of the Ayrshire or Jersey breeds in style or carriage, but it is equal to the Holstein and superior to the Brown Swiss in these qualities. Guernseys are tractable animals, they lead readily if properly trained, and they are seldom nervous or high strung.

The mammary system: The texture or udder quality of the Guernsey breed is considered very good. Stated another way, a Guernsey udder usually milks out well and, if palpated when empty, is soft and pliable to the touch. In udder shape or form, the breed rates no higher than average among the five major dairy breeds. In this breed the udders are usually deeper in relation to length than is desired, and tbey lack somewhat in width and snugness of attachments when compared with the best udders of some of the other breeds. Furthermore, the teat placement and distance between the teats, as well as their shape and size, seldom conform to the ideal. The floor of the udder lacks the smoothness usually found in more desirable udders.

In general, Guernsey udders are durable and survive the hazards of herd existence about as well as those of any other breed, with the possible exception of the Brown Swiss.

Slaughter qualities and acceptance for beef: The body fat of the Guernsey breed is distinctly yellowisb in color, thus causing the meat to be less acceptable in the markets. The breed ranks slightly

higher than the Jersey for slaughter purposes, mostly because this breed is somewhat larger in size, and the animals usually carry slightly more condition when slaughtered

Guernsey calves are relatively small at birth, weighing 65 to 70 pounds They are not easy to grow and seldom take on condition or fatten readily at an early age Thus they are not regarded highly for veal purposes

Breed Strengths and Weaknesses

Guernsey breeders have no basic color problem in meeting registration requirements Red is a recessive color and spotting is also a recessive character, therefore, they both breed true

The breed is naturally open in conformation, and the ligaments holding the shoulder blade and fore leg to the skeleton more often fail in the Guernsey than in any other breed If this takes place, the condition known as "winged shoulder' develops ' Wing shoulder" is discussed and illustrated in Chapter 13 This defect is more often found and in a more serious stage in the Guernsey than in any other breed of dairy cattle

With opportunity and environment essentially the same, the livability of Guernsey calves is slightly less than that of the other dairy breeds

The breed has made excellent progress in type improvement in the past 40 years Figure 16 1 shows a panel of three cows that were grand champions at the National Dairy Show in 1906, 1909, and 1910, 1911, and 1912 The legends accompanying the panel give the names of the animals and the year or years they were champions

In contrast compare the cows in Figure 16 2 These three cows were the champions in 1947, 1952, 1953, 1954, and 1956 They are extremely fine specimen of the breed and clearly indicate the progress that has been made in improving conformation and mammary system, especially udder in the Guernsey breed

Points of Breeder Emphasis

Breeders, in addition to improving the type of their animals, are extremely anxious to bold or increase the size of their breed They wish to produce rugged cattle that also possess the quality and productive potential that has been characteristic of the breed Furthermore, they are very much inclined toward the development

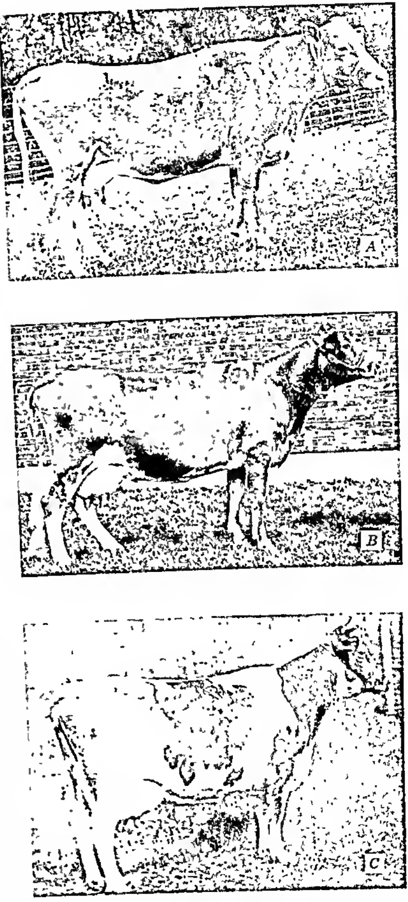


Fig. 16.1 This panel shows three Guernsey cows that were each awarded one or more grand championships at the National Dairy Show. Cow A—Gertrude Kelley was champion in 1906, cow B—Victoria of Fern Ravine in 1909, and cow C—Glencoe's Bopeep in 1911, 1912, and 1913. Compare the type of these cows with that of the cows in Fig. 16.2.

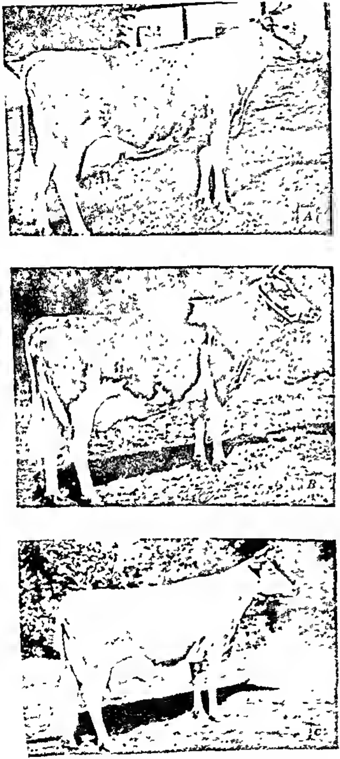


Fig. 16.2 These three cows have each won one or more grand championships at recent National Guernsey shows. Cow A is Quail Roost Noble Primrose, grand champion in 1947, cow B Hagen Farms Merry Song, champion in 1953, 1954, and 1955, and C is Lushacres Hermes Quest, grand champion in 1956. These cows are vastly superior in type, mammary system, and eye appeal to the cows shown in panel 16.1. They are also superior *in production, having* averaged approximately 200 lb. more fat each than the early-day champions.

Fig. 16.3. This Guernsey cow, Illini Lindy Mirondo Pride, portrays a desirable type of cow of the late '20s and early '30s. She is smooth, of medium size, and with a production at 6 years of 9843.9 and 540.5 lb fat. She lacks both the scale and productive capacity of the highly regarded Guernsey cow of today. (See Fig. 16.4.)

Fig. 16.4. This picture of Osborne Hill Etta portrays the present concept of what a good Guernsey cow ought to be. She is a cow of good size and excellent in dairy qualities with a well shaped and capacious mammary system.

of longevity and durability in their cattle, because they know that this quality is associated with economy of production and reproductive efficiency

The American Guernsey Cattle Club has advanced farther in the development of a program for marketing the milk of their breed than other breed associations Their program of herd classification is unique in that it requires and records the reclassification of the superior animals within the breed

chapter **17**

The physical and morphological characteristics of the Holstein-Friesian breed

The Holstein-Friesian breed has taken a commanding position among all breeds of dairy cattle. In registered animals, for which statistics are readily available, the numerical growth of the breed has been quite constant and rapid. Currently, upward of 50 per cent of all of the dairy cattle registered annually are Holstein-Friesian. The same might also be said of traffic in cattle, which is best indicated by the number of transfers issued, as well as of the number of animals on Herd Improvement Registry test. This popularity of the Holstein-Friesian has been earned rather by the economic qualities of the breed than because of any determined promotional program.

The breed is distinctive in appearance by virtue of its sharply contrasting colors and its large size. It is regarded favorably by dairymen because of its high milk yield. The characteristic color pattern has been maintained and stabilized to some extent because of certain color restrictions that bar registration. The high yield of milk and a generally favorable (to the breed) pricing arrangement for fluid milk have made Holsteins highly popular in fluid-milk-producing areas. The breeders of Holstein-Friesian cattle have seen fit to develop and improve the milk-yielding character-

istic of the breed, and this in turn has resulted in a generally favorable public acceptance of their cattle

General Characteristics of Holstein Form

This breed is characterized by a large frame, a generally angular and dairy like form, and a large capacity to consume roughage In the United States the dairy qualities and milky-looking appearance of the breed have been especially developed, whereas in their native home, the Kingdom of the Netherlands, more often referred to as Holland, the meat or beef form and dairy form have had more nearly equal emphasis Figure 17 1 shows the form of the grand champion cow at the 1956 National Dairy Show, Plain View Inga, and Figure 17 2 shows a photograph of a group of famous Holland cows You will note that there is somewhat more stockiness and thickness of covering in the Holland type than in our American Holsteins This quality is even more evident in bulls than in cows Figures 17 3 and 17 4 compare the two types of bulls in general conformation The legends more fully describe their physical qualities

HOLSTEIN BREED CHARACTER AND CONFORMATION

The Holstein Friesian breed is very old, especially in comparison with some of the other breeds of dairy cattle The breed has been described in early literature for upward of 2000 years The characteristic "piebald," a term first used to describe the black and white spotted color, has been a trademark of the breed since its origin Although black and white spotted with a clearly defined separation between the colors prevails, animals may be almost self-black or almost self-white The restrictions in color requirements that bar registry will be discussed later

The breed is characterized by large size Mature cows when in ordinary working flesh are expected to weigh 1500 pounds Many of the outstanding cows of the breed in both production and conformation weigh 2000 pounds when in high condition and heavy in calf Mature bulls of this breed are expected to weigh 2000 pounds or more A considerable number do attain a weight approaching or exceeding 3000 pounds It should be emphasized, however, that physical size in bulls although correlated with, is not as important as, genetic size This is because the bull does not

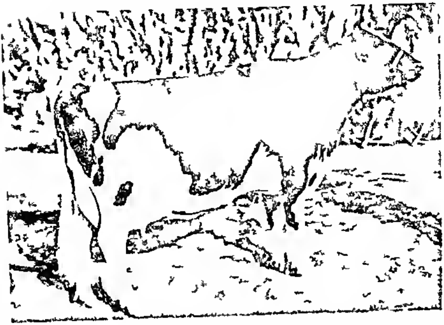


Fig 17 1 This photograph p ctures Pla n View Ingo Grand Champian Halstein cow at the National Halstein Show She was also chosen All American aged cow far 1956 She has a yearly record of 25 942 lb milk and 1042 16 lb fat

function in production, and it is his genetic size, irrespective of physical size, that is transmitted to his progeny

This statement should not be construed to imply that smallness due to inadequate nutrition may not impair the health and thus the relative fertility of the animal Good general health and a proper plane of nutrition have a favorable influence on both the amount and quality of semen Heavy feeding and the resulting high condition do have an appreciable negative influence upon the libido (desire to mate) of a bull

Fig 17 2 Shows a rear view of several Holland Holstein cows l ned up together They are somewhat squarer and more stockily bu lt than our more da ry l ke Holsteins In general, their udders are less shapely than those af aur better cows

Fig 17 3 Shows a famous Holland Holstein-Fr es an bull Note that he is thickly covered and more stockily bu lt than the bull shown in Fig 17 4

Well developed bulls with adequate size, however, do possess more eye appeal and usually have better public acceptance It is only bulls that are well developed for their age that are successful in the show ring In America the size referred to is gained by vir tue of a large skeleton or frame and a reasonably heavy bone Large framed animals of this breed are usually reasonably long of leg and angular in form

Fig 17 4 Pabst Fobes Burke was grand champion Holste n bull at the National Holstein Show and All-American aged bull in 1956 57 He is cons derably longer in body and more da ry l ke in appearance than the Holland bull shown in Fig 17 3

Size in Holsteins is influenced by inheritance, topography, regional or sectional effect, and by the quality and quantity of the feed supply. In general, animals located in the Corn Belt are larger than those found in the southern states and in New England. The quality and uniformity of type may, however, be equal to or superior in the New England area.

If it is possible to show in a series of photographs the different stages in the life cycle of animal, undoubtedly the best cow of the breed for this purpose is Triune Papoose Piebe. She was chosen as the all time All-American Holstein cow and achieved the All-American distinction for each age classification from that of heifer calf to mature cow. She is presented here to serve as a visual standard of what an outstanding Holstein cow ought to look like from the time she is a heifer until maturity. Figures 17.5*A* shows the heifer form, *B* the two-year old, *C* a dry three-year old, *D* a four-year old cow, and *E* in mature form or as an aged cow. The legends are helpful in providing additional information.

Colors that bar registration:[1] Holstein breeders have endeavored to retain the characteristic black and white markings and have established color patterns of the breed by excluding from record in the herd book animals that did not conform to requirements. There are eight color deviations that prohibit otherwise eligible animals from being recorded. These are: (1) red and white, which is becoming a somewhat more serious problem in the breed since one sire (which is a carrier) in extensive artificial service can have from 5000 to 10,000 progeny, (2) solid or self-black, (3) solid or self-white, (4) black on the underline or belly, (5) black in the switch, (6) black encircling the leg and touching the hoof, (7) black from hoof to knee or hock, and (8) black and white intermixed so as to give a color effect (usually gray) other than distinct black and white.

Development cycle and sexual maturity: If the major breeds of dairy cattle were arranged according to the age of their full maturity, the Holstein-Friesian breed would occupy a mid-position. In other words, two breeds would mature at an earlier age, and two breeds at a later age. Thus Holstein cows from a functional or production point of view would be expected to gain in capacity from first calving until they were 6.5 years old and after 9.7 years of age

[1] Taken from Article 4, Section 12, of the by-laws of the Holstein-Friesian Association of America.

Fig 17 3 Shows a famous Holland Holstein Friesian bull Note that he is thickly covered and more stockily built than the bull shown in Fig 17 4

Well developed bulls with adequate size, however, do possess more eye appeal and usually have better public acceptance It is only bulls that are well developed for their age that are successful in the show ring In America the size referred to is gained by virtue of a large skeleton or frame and a reasonably heavy bone Large framed animals of this breed are usually reasonably long of leg and angular in form.

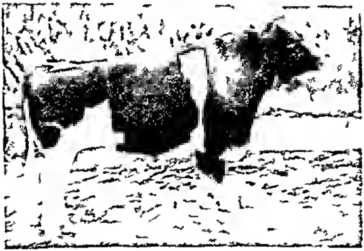


Fig 17 4 Pabst Fobes Burke was grand champion Holstein bull at the National Holstein Show and All-American aged bull in 1956–57 He is considerably longer in body and more dairy-like in appearance than the Holland bull shown in Fig 17.3

would gradually decline in production. For show-ring classes, cows are considered mature after they are five years old.

Heifers of the Holstein breed reach sexual maturity somewhat later in age than Jerseys, for example, but earlier than Brown Swiss. Heifers are usually expected to calve from 24 to 30 months of age, depending on size and other contributing factors.

Slaughter qualities and acceptance for beef and veal: Size and weight are a distinct advantage to this breed as determinants of their beef value. Packers find that the cost of boning out in proportion to the weight of meat recovered is less for the larger, heavier animals. Furthermore, the fat is white in color, and the carcass value of the animal is as good as that of any other breed of dairy cattle with the possible exception of the Ayrshire. Holstein veal is looked upon favorably in most markets, and the name Holstein is often used in hotel menus to describe their veal entree.

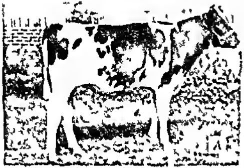
Crossbreds between grade Holstein cows and the beef breeds, notably with Angus bulls, are usually black in color and possess many of the beef qualities of the Angus. Crossbred steers produced in this way do quite well in the feed lot. The gains are usually quite high, and the carcass of a good-quality and well-fitted animal will usually grade choice.

Disposition and temperament: As a breed Holsteins are docile, handle readily, are even tempered, and yet relatively alert. In the milking line they are not easily disturbed and usually milk out freely and quickly. They do equally well when at pasture and under barn feeding. They stand cold well and thrive in the more vigorous climates. They do not respond to high temperatures as well as the smaller breeds, especially Jerseys.

Style and carriage: Although the Holstein breed is tractable, handles easily, and possesses alertness, it does not have the style of carriage possessed by the Ayrshire or Jersey breeds. Even though Holsteins may lack somewhat in style and carriage by comparison, in the better animals conformation and capacity is not excelled by other breeds. In mammary system the breed lacks the shape of udder found in the Jersey and probably the Ayrshire, but the capacity of the gland is unexcelled.

Points of Breeder Emphasis

A quarter of a century ago, a point of major emphasis in the breed was that of raising the average per cent fat content of the milk.



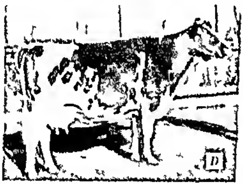


Fig 17 5 *Carefully study these five figures for they portray the different major stages in the development of a cow* A shows Triune Papoose Piebe as a *heifer calf*

B Triune Papoose Piebe as a 2 year old, well advanced in lactation Note *the* increase in depth from previous picture

C This shows the Papoose heifer in 3 year old form Even though dry, she shows excellent dairy qualities

D In this photograph taken when Papoose was 4 years old she *is showing the development* expected of a great cow She has excellent depth, *splendid* scale, and a *good udder*

E This is Triune Papoose Piebe as a mature cow She is a cow of great size and capacity and at the same time has excellent balance and eye appeal

countries in South America, Cuba, Japan, Canada, and other countries In general, the quality of cattle exported, in both production and type, is above the average of the herds from which they came Although the numbers exported are not large, the exportation business has a favorable influence upon both the United States and import countries

Inasmuch as there is high correlation between per cent fat content and solids other than fat in milk, both were raised somewhat by this selection pressure It is generally agreed that the average per cent of fat is sufficiently high to serve the best interests of the breed, and emphasis has now been shifted to the improvement of other qualities In 1929 a program of herd classification for the improvement of type was approved by the board of directors of the National Holstein Friesian Association and put into operation From the time of its inception to January 1, 1956, a total of 11,811 herds have been classified or reclassified In all, 231,237 animals have been classified or reclassified This program (1) has made breeders more conscious of and better judges of Holstein type, and (2) has tended to improve conformation, especially the mammary system

Currently, the heaviest emphasis is toward increasing yield of milk without conceding in percentage of total solids More recently, emphasis is also being placed upon increasing the soundness and durability of cows so that they will remain in the herd for a longer period and thus leave more progeny and produce milk at a lower unit cost

There is also continued emphasis upon improving conformation, especially shape of udder, soundness, and eye appeal

Foreign Influence and Foreign Markets

The foundation of our present day Holsteins came from Holland and Friesland At that time, of course, the type was influenced by the importations themselves and by the impressions breeders received from viewing imported animals The continued existence of foot and mouth disease in their native home, together with improvement and numerical growth in our own native cattle, made further importations of Holsteins inexpedient and undesirable, and so they were discontinued

Currently the Holland influence is almost negligible in the United States A good many Holsteins are imported each year from Canada In 1956, according to the Canadian Holstein Association, 16,334 registered animals were transferred to 1498 United States buyers, but Canadian cattle are hard to distinguish from our native Holsteins, and type is influenced very little, if at all, by these importations

In recent years Holstein cattle have been marketed quite extensively in foreign lands Such exportations include Mexico, various

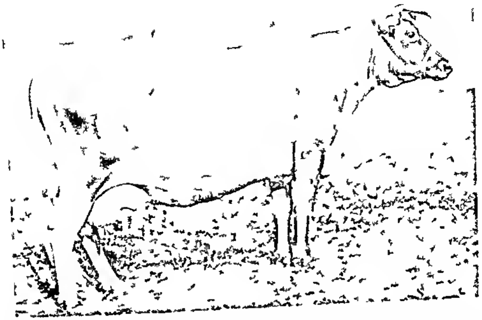


Fig 18 1 This cow, Raleigh s Oxford Thistle, was the first cow bred in America to be made grand champion at the National Dairy Show Since 1925 the type concept of Jersey breeders in the United States has been less influenced by animals imported from the Island of Jersey than in earlier years

explained geographically The Island of Jersey is a small community—small enough to permit any cow on the Island to be naturally mated to any bull in service This proximity promoted the desire on the part of Island breeders to mate their best cows to the best-known bulls Fortunately, Island Jerseys were either not the possessors of many objectional recessive characters or they were kept in control by breeders For Island Jerseys responded better to inbreeding than most of the breeds of dairy cattle.

GENERAL PHYSICAL CHARACTERISTICS OF THE JERSEY BREED

Dairy cattle breeders, no matter what breed they favor or own, are generally agreed that the Jersey breed as a whole has greater uniformity in type, possesses a more desirable mammary system, and probably has greater beauty of form than any other breed of dairy cattle The breed is small in size—the smallest, in fact, of the five major breeds of dairy cattle Cows at maturity, when in milk, are expected to weigh 1000 pounds In many sections of the country, where Jerseys have their greatest numerical strength, mature cows in heavy lactation would average considerably less in

chapter **18**

The physical and morphological characteristics of the Jersey breed

The Jersey breed in America has gained many of its present qualities directly from its ancestors on the Island of Jersey. The birthplace of this breed, a little island called Jersey in the English Channel, is small enough to be homey; yet it was large enough to populate the dairy world with a very highly regarded breed of dairy cattle. This tiny piece of land scarcely more than 10 miles long and two thirds of that distance in width bas played a most important part in sbaping the physical and morphological qualities of the breed in the United States. Not only have imported animals been a material factor in providing superior germ plasm for us, but they have likewise done much to shape breeder opinion.

Perhaps more than in any other breed of dairy cattle, the current type is the product of the bomeland influence. Until Raleigh's Oxford Thistle (Fig. 18.1) was made grand champion at the National Dairy Show in 1925, previous female grand championships had been won by imported cows. It is probable that the uniformity of type for which the breed has been noted is to some degree accounted for by the greater amount of inbreeding commonly present in imported animals, especially bulls. The greater tendency to inbreed or linebreed Island Jerseys than American-bred animals is

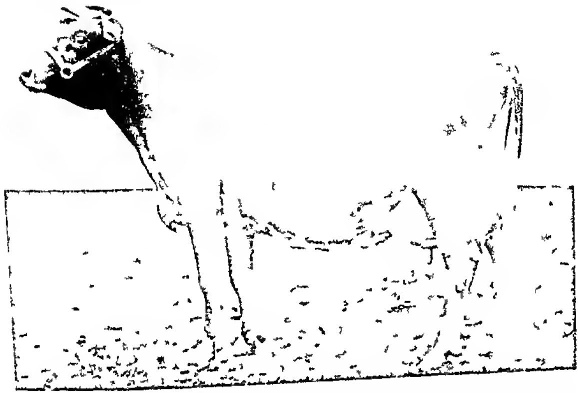


Fig 18 2 Even though this cow, Oxford Majesty s Gypsy, lived 40 years ago, she would be regarded as a good specimen of the breed today She was grand champion at the National Dairy Show in 1917 and 1918

trates the best that existed in Jersey character and type 40 to 50 years ago She would, in fact, be a highly acceptable animal in the show rings of today. Figure 18 3 presents Design's Martina exhibited somewhat more recently (1935) "Martina" was a cow of excellent conformation In topline and body conformation she provides a splendid example of Jersey type and breed character In strength of rear udder attachment and in straightness of rear legs she can be faulted somewhat

The mammary system There is not a breed of dairy cattle that is superior to the Jersey in shape of udder or shape and placement of the teats In strength of front udder attachment and possibly in texture of udder, the breed does not appear quite so favorably by comparison But, in general, the mammary system of cows of this breed, especially the better-yielding animals and those with superior conformation, tends to establish the concepts by which the more desirable mammary systems in all breeds are rated To illustrate, the president of one of the dairy cattle breeding associations, not Jersey, while attending a National Dairy Show in speak-

weight than the figure (1000 pounds) given above. The desired weight for a mature bull in breeding condition is 1500 pounds. Again this weight figure is somewhat higher than the average weight of mature bulls in service.

Color and color variations: The basic body color of the Jersey is some shade of fawn. There is a high degree of variability in body color. The range is from black or near black to a very light beige of medium brilliance. The animal may be solid, or self-colored with black tongue and switch, or spotted. If it is spotted, the body color generally predominates, and the tongue and switch are usually light in color. The unhaired portions of the body such as the muzzle, around the eyes, about the vulva, etc., are usually dark in color, even when the animal is spotted. If spotted, the body color is interspersed with white. Self- or solid-colored animals predominate numerically in the breed.

JERSEY BREED CHARACTER AND CONFORMATION

The Jersey breed is characterized by a great deal of fineness and quality. The features, especially about the head and face, are finely chiseled. The eyes are large relatively, and very prominent. The face is broad, in relation to length, and deeply dished. The breed character that is displayed in the head is exhibited also throughout the entire body.

In chest and body capacity, if size is taken into account, the Jersey breed rates high. Perhaps it is most realistic to consider body conformation and especially capacity in terms of breed size. Thus, as a breed, Jerseys give the impression of being somewhat lower set than the other dairy breeds. (Stated in another way, the Jersey is a small but an extremely capacious animal.)

Jerseys possess uniformity: Jerseys tend to be more uniform in type and form than any other breed of dairy cattle. In general, the rumps in this breed are more nearly level, the pinbones are relatively broader, and the tail setting finer and more smoothly tucked between the pinbones than in any other dairy breed. The breed is uniformally and consistently rated high in dairy qualities or lactation drive. Jersey type and desirable conformation have been consistently observed for many years. For example, Figure 18.2 pictures Oxford Majesty's Gypsy, the grand champion Jersey female at the 1917 and 1918 National Dairy Shows. This cow illus-

Fig 18 4 A desirable shape and size of Jersey udder This udder has height and width of rear attachment and is well held up in front It would be improved if the teats were slightly longer and more perfectly centered, especially under the fore quarters

Fig 18 5 The mammary system of the Jersey cow, Brampton Lady Basilua, shows excellent form combined with exceptional production Her udder illustrates how well the qualities of form and productive capacity can combine to make a cow highly desirable This cow held the world s butterfat record for the breed of 19,012 3 lb milk and 1312 8 lb fat for several years

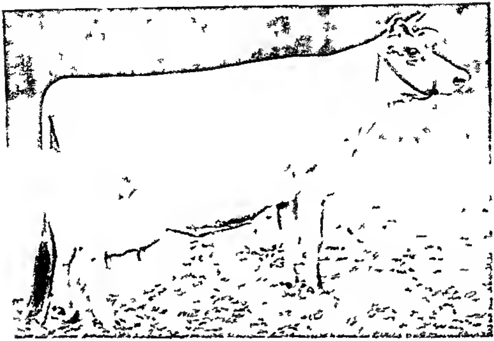


Fig 18 3 Design s Mart na portrays qu te well the quality straight topl ne and long level rump that has long been characteristic of the breed (Courtesy The American Jersey Cattle Club Columbus 5 Ohio)

ing of the aged cow class said, ' There are twenty cows of the Jersey breed on these grounds that are better in udder than is our best uddered cow" Figure 18 4 illustrates a highly desirable mammary system of the Jersey breed Figure 18 5 shows the mammary system of Brampton Lady Basilua, a world's record cow for butterfat production of the Jersey breed These are two excellent examples of highly desirable yet very capacious mammary systems

Development cycle and sexual maturity The Jersey breed reaches sexual maturity at an earlier age than any other breed of dairy cattle W L. Gaines, in his studies on maturity at a given age for six breeds of dairy cattle including Milking Shorthorn, found that the Jersey matured from three to four months younger than the average of the breeds and about two months earlier than the second earliest maturing breed Because of this, Jerseys if well grown may be first served from 14 to 16 months of age and often calve at 23 to 25 months old.

It might be assumed that, since Jerseys mature at an earlier age

In recent years increased interest in the nonfat fraction of milk and in efficiency of milk and energy production per unit weight of animal has tended to draw new attention to this breed. In the last few years Jersey breed milk has found good acceptance in certain special metropolitan markets. If this market expands sufficiently, and continued studies demonstrate the high efficiency of the energy input–output relationship shown in the early studies, the breed has prospects of being restored to much of its original relative popularity.

Heat tolerance: Jerseys thrive better than most other breeds of dairy cattle in sections of the country where seasonal temperatures are relatively high. Samuel Brody found, in his climatic laboratory studies at the University of Missouri, that, when Holsteins and Jerseys were both subjected to an atmospheric temperature of 105° F., the body temperature of the Holsteins reached 108° F. (almost a lethal temperature) and the Jersey 106° F. He also found that larger animals were more adversely affected by high temperatures than smaller animals. This difference in response is due at least in part to the proportionately greater surface area per unit of weight in the smaller animals.

It was demonstrated by Brody also that the heat-control mechanism of Jerseys subjected to atmospheric temperatures of 80° F. or more tended to fail and thus caused a reduction in milk yield. But, when the larger breeds were tested in the same manner, a temperature of 70° F. produced a somewhat similar reduction in milk yield—thus showing that Jerseys are somewhat more heat-tolerant than the larger dairy breeds.

Areas where Jerseys predominate: No doubt the ability to tolerate higher temperatures has had some influence upon the geographical distribution of the Jersey breed. Furthermore, the ability to give a good account of themselves when adequate feed was lacking has also been a factor in Jersey popularity. Whatever the reason, Jerseys have dominated in the dairy sections of the southern and South Central states. They provided the family cow before the use of refrigeration and before general milk delivery from house to house was prevalent.

Points of Breeder Emphasis

During the fiscal year (April 1 to March 31) 1954–55, 1106 breeders tested 31,870 cows for production. During the same period, 1020 breeders classified 31,675 animals. During the fiscal

than other dairy breeds, they would be expected to exhibit less durability This is definitely not the situation as Jerseys are held in good repute for possessing longevity

Style and carriage In these qualities the breed rates high It was emphasized in an earlier chapter (14) that the Ayrshire breed has excellent style and carriage Among the cows of the dairy breeds, Jerseys are rated almost equal and, in bulls, fully equal to the Ayrshire Wilbur Marsh, a famous Guernsey breeder and exhibitor, while standing at the ring side observing the Jersey bull Fern's Wexford Noble as he came through the gate to enter the show ring, said "Do you know what that bull reminds me of?" Then, without waiting for a reply, he added, "Well, it's a battleship, in full armour, steaming into port" Perhaps no other Jersey bull has had the commanding size and proud carriage of "Wexford," but there are many that do possess excellent style and carriage

Slaughter qualities and acceptance for beef The Jersey rates at the bottom of the scale among the breeds of dairy cattle for beef purposes The cows are small in size, are usually not well fleshed when slaughtered, and, if boned out, have a high labor cost because of the small amount of meat for the labor involved Furthermore, the body fat of the Jersey is yellowish in color, thus making the meat easily identifiable and less acceptable

Jersey calves are small at birth, average weight approximately 55 pounds, and they are looked upon unfavorably for veal. It should be mentioned, however, that, although the calves are small at birth, they are vigorous and survive very well under average herd conditions

GEOGRAPHICAL DISTRIBUTION

In the large fluid milk markets Jerseys, because of the high percentage of total solids and butterfat in their milk, and somewhat unfavorable pricing methods, have not been in a popular competitive position compared with the lower testing and heavier milking breeds On the other hand, the efficiency and economy with which they were able to produce butterfat and solids other than fat have encouraged their acceptance in sour cream and special butterfat markets. Such markets are not usually located adjacent to large cities or in areas where the cattle population is dense Therefore, Jerseys tend to have a wide general distribution without points of great concentration

chapter **19**

The physical and morphological characteristics of dual-purpose cattle and the minor dairy breeds

The basic reason why dual-purpose cattle are grown is to make use of their ability to produce a good quantity of milk and also take advantage of their beef-producing qualities. They are not presumed to equal either good dairy cattle in the efficiency with which they produce milk or the best beef cattle in their beef-making qualities. They are, however, better than beef cattle in the production of milk and superior to dairy cattle in beef production.

They seem to have a definite place in our economy. Under certain situations, dual-purpose cattle make it possible to utilize and distribute labor more advantageously, and they can also provide a cash income in the milk or cream sold. They seem to integrate well in the small, general farm enterprise, especially when the livestock project is not one of intensive operation.

Biologically, the problem is not only the relative efficiency with which dual-purpose cattle can convert the energy of feed into energy of milk or beef, but also whether or not these functions are compatible.

The Compatibility of Dairy and Beef Qualities

A cow while producing relatively large quantities of milk is utilizing the nutrients of her feed for milk production and to main-

year 1955–56, 967 breeders tested 29,956 cows for yield, and, in the same period, 858 breeders classified 29,096 animals for type. As an average for the two years, 30,913 cows were tested for yield, and 31,885 animals were classified for type.

It would appear that approximately equal emphasis is being given to the improvement of type that is being applied to the improvement of production in this breed. Jerseys are slightly larger than they were 30 to 40 years ago, but there has been no major change in the concept of type during that period. There has, however, been an improvement in type as is shown by classification ratings for the past ten years. There has been an increase in classification ratings from an average of 83.15 in 1946–47 to 85.28 in 1955–56. This apparent improvement is accounted for by a greater percentage of very good and excellent animals and by the reduction in fair and poor animals. Perhaps the greatest gain in the classification program is that the Jersey breeders themselves have become better judges of type and conformation in their animals.

The Milking Shorthorn

It is arguable whether the Milking Shorthorn of today should be classed as a dairy or as a dual-purpose breed. Many are of the opinion that ultimately Milking Shorthorns will be developed in dairy qualities to a point that they will be accepted and classified as a dairy breed. But currently they are distinctly the most dairy-like of the dual-purpose breeds. Cows of the breed rate well in milk yield, especially during the first few months of their lactation.

GENERAL PHYSICAL CHARACTERISTICS OF THE MILKING SHORTHORN BREED

Milking Shorthorns are a breed in which the animals are large in size, not as tall perhaps as the Holstein-Friesian or Brown Swiss, but almost comparable in weight. Mature cows of the breed weigh from 1400 to 1600 pounds. Some cows are even heavier, especially before calving. Mature bulls weigh 2000 pounds or more. In order to classify excellent, a cow of this breed must tape 73 or more inches (equivalent to 1100 pounds) in heart girth.

The most acceptable type of the breed is indicated in Figures 19.1 and 19.2. The cow illustrated shows the qualities of the breed that are cherished by breeders. She has size, smoothness, width and rib spring, depth, and a good mammary system. She shows dairy quality and competence as a producer of milk, but also exhibits the ability to take on flesh readily and smoothly when dry.

The bull shown in Figure 19.2 has size, type, smoothness, and length, yet displays many characteristics that would commend him for his beef-producing qualities.

Color and color variations: Dairy and beef Shorthorns are colored much alike. They may be red or white self-color or spotted red and white. They may also be roan. The evidence points to the fact that the last is the heterozygous condition and is the result of mating reds and roans or reds and whites together. When roans are mated, reds, whites, or roans may be obtained.

Uniformity of type: Dual-purpose cattle are bred to serve two functions: milk and beef. Because of this, their type varies some-

tain her activity and body functions At such times she cannot display to any high degree her beef making qualities Thus, if compatibility is interpreted to mean that a cow must be a good milk producer and at the same time maintain high condition to be a good beef animal, then biologically milk and beef production are not compatible For they cannot be carried on simultaneously even in good dual purpose cattle

If we take the view, however, that a good dual purpose animal is capable of producing a desirable yield of milk when milking and then can take on flesh when dry, so that she can produce a desirable beef carcass, milk production and beef production are relatively compatible Furthermore, animals bred for the dual purpose function are capable of producing progeny that when properly fitted have a high degree of acceptability as beef animals

Obviously the physical characteristics of dual purpose cattle differ somewhat from those of the dairy breeds The principal differences occur in those qualities which indicate lactation drive and in the development of the mammary system.

Dual Purpose Form or Type

The dual purpose animal is more compactly built, less open in conformation, does not have the length of neck or body, and is thicker through the thighs than are the better animals of the dairy breeds Furthermore, its mammary system is less well developed, the udder not as desirable in shape and texture, and it is smaller than the udders of cows of the dairy breeds

There is also considerable difference among the dual purpose breeds themselves in type and conformation There is likewise a considerable amount of variation from herd to herd Some breeders place more emphasis upon milk production than others do, whereas others favor the more acceptable beef form and maintain their herds more like beef than like dairy herds

Undoubtedly the greatest development in the dairy quality is found in the Milking Shorthorn In fact, some herds of Milking Shorthorns possess a rather highly developed and acceptable dairy form with good shape texture, and size of udder Such herds resemble the characteristics of the dairy breeds and are more like the Milking Shorthorns of England than they are like those of the United States

what more, especially as it relates to dairy tendency or lactation drive, than would be expected within a dairy breed. Stated another way, Milking Shorthorn cows may tend toward beefiness, or they may be quite dairy-like in conformation. It requires a great deal of selection to develop and breed a uniform herd.

The mammary system: As a breed Milking Shorthorns rate below the dairy breeds in size and shape of udder. The udders are more inclined to be quartered, with less length and they exhibit a lack of smoothness on the floor and show less veination both on the udder and on the body than is observed in the dairy breeds. Figure 19.3 shows a highly acceptable Milking Shorthorn cow. The udder and body of this cow, Lilydale Dagney, represent a high standard for the breed. In general, the texture of Shorthorn udders is superior to their shape or form.

Development cycle and sexual maturity: In a comparison of Milking Shorthorns with the five recognized breeds of dairy cattle, W. L. Gaines found that the breed was slow in reaching maturity. In fact, it was as late in maturing as the Brown Swiss breed of dairy cattle. Stated in terms of the average of the five dairy breeds, the Milking Shorthorn breed requires six months of additional age to reach full maturity.

Compared to the mature size of the breed, Shorthorn calves are small at birth. Birth weights average from 75 to 80 pounds, or on the average approximately 6 per cent of the live weight of the dam. This is lower than that found for the breeds of dairy cattle. Thus Milking Shorthorn heifers can be mated to calve several months younger in age than Brown Swiss, a breed that matures at essentially the same age.

Slaughter qualities and acceptance for beef: Dual-purpose cattle rank high in their beef value. Milking Shorthorns are definitely superior to the best dairy breeds in carcass value and compare favorably with other dual-purpose breeds. Milking Shorthorn veal, because of a rather low birth weight, is about average, or slightly below when compared with Holstein-Friesian or Brown Swiss veal.

Distribution

Milking Shorthorns are found in many parts of the world, with a rather high concentration in England and Australia. In the

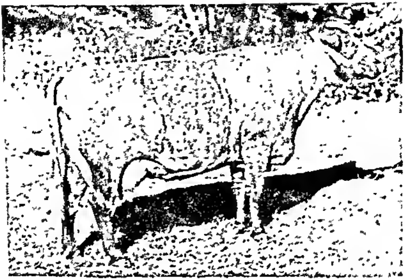


Fig. 19.1 This Milking Shorthorn cow, Lilydale Lady Lou, is a smooth cow of excellent conformation, with a shapely udder and possessing ample size. She has won many honors in the show ring. (Courtesy, American Milking Shorthorn Society.)

Fig. 19.2 Erora Pride B is a highly regarded sire of the Milking Shorthorn breed. He combines highly acceptable beef conformation with dairy qualities. Note especially his stretch and length of body combined with a well-filled loin and well-rounded and relatively thick thighs. He is highly prized as a sire of good production and type. (Courtesy, American Milking Shorthorn Society.)

United States they are rather well distributed, with the highest concentrations found in the North Central States, especially the states of Kansas, Iowa, and Illinois.

Points of Breeder Emphasis

There is some division of opinion among the breeders of Milking Shorthorns concerning the relative emphasis that should be placed upon dairy qualities and beef type. In view of the fact that in 1948 the Milking Shorthorn breeders set up their own herd book and called their organization the American Milking Shorthorn Association, it is logical to conclude that greater emphasis is to be placed upon the milking qualities of their animals.

Milking Shorthorn breeders are placing considerable emphasis upon the development quality and smoothness in their cattle. Especially are they anxious to get rid of the patchiness about the hips and pinbones and the rolls of fat over the back that have prevailed in cows that were poor milk producers.

The Red Polled Breed

The dairy qualities in the Red Polled breed are not so well developed as they are in the Milking Shorthorn. In general, the breed is somewhat smaller than the Milking Shorthorn but, compared to the dairy breeds, would rate above average in weight. The breed is truly dual-purpose, and somewhat less emphasis has been placed on dairy than on beef qualities. The cows hold their flesh well when milking and resemble beef animals slightly more than heavy-milking dairy cows.

PHYSICAL CHARACTERISTICS OF THE RED POLLED BREED

Cows of this breed are expected to weigh from 1300 to 1500 pounds. Mature bulls weigh 1800 pounds and above. The breed is naturally polled, and the presence of horns or scurs bars registration. The breed is tractable, easily handled, and, being polled it does well under a loose housing system of management.

Color and color requirements: The breed is red in color. There is considerable variation in the shade of color, but cherry red is favored. The breed is generally self or solid color, except that the

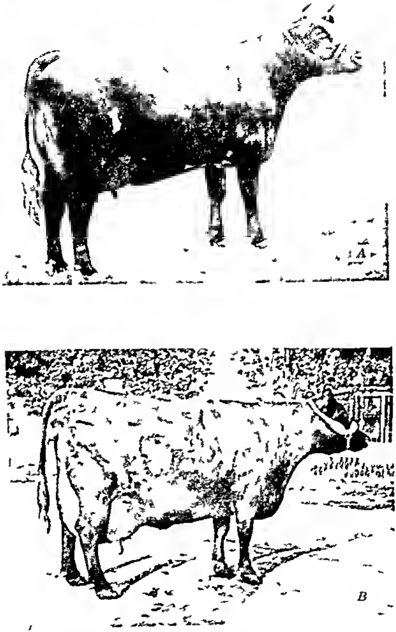


Fig 19 3A and B Shaw Lilydale Dagney as a young cow and at an advanced age As a young cow she had excellent conformation and excellent udder As a cow advanced in age she retained her desirable conformation and desirable shape of udder She provides a good example of a desirable and durable cow (Courtesy, American Milking Shorthorn Society)

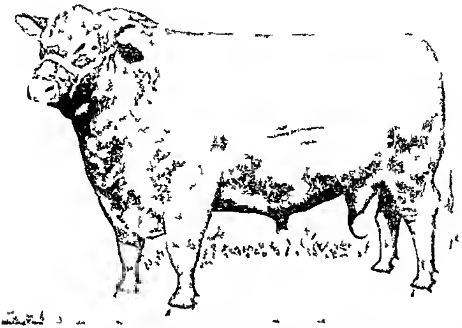


Fig 19 5 Few bulls of any breed will possess a better conformation or more smoothness than this Red Polled bull He has good size excellent depth of chest and body and he stands well on his legs He appears, however to possess a somewhat better beef form than dairy form (Courtesy, Red Polled Cattle Club of America)

tems Usually the udders are rather badly quartered, and often the teats are neither well placed on the quarters nor do they hang plumb (point downward) Although the score card places heavy emphasis on udder (25 per cent), and the phrasing used is quite similar to that found on the score cards of the dairy breeds, few udders equal that shown in Figure 19 4 Not many could score above good if judged by dairy standards Figure 19 4 shows a distinctly superior mammary system for the breed Compare it with the best udders shown in Chapter 11

Slaughter qualities and rate of maturity The type and physical characteristics of the breed assure desirable slaughter qualities Steers of this breed are now eligible to compete in the International Livestock Exposition Carcass Contest They are eligible in the fourth class which includes crossbred steers, breeds other than Angus, Hereford, Beef Shorthorn, and the dual purpose breeds The best Red Polled steers were rated prime in grade and had dressing percentages from 63 to 65 per cent

The breed rates high in beef value, relatively better than for dairy purposes In sexual and full maturity Red Polls would be

switch may be white, and the udder and a small area around the udder may be white. Otherwise, no white is tolerated. Cloudy muzzles are considered objectionable. The nose should be flesh-colored.

Type and uniformity: In appearance and in type the breed tends to resemble beef animals somewhat more than it does dairy types. The lines are straight; the topline and underline, especially in younger animals, tend to be parallel. The ribs are well sprung, and the body lacks somewhat in the length and stretch found in dairy animals. Figure 19.4 shows an outstanding Red Polled cow. She is smooth, well covered with flesh, and resembles the beef type rather better than the extreme dairy conformation. She has an udder of moderate size but one that compares favorably in the symmetry, balance, and teat shape and placement with the shapely dairy udder. Figure 19.5 shows an equally well-received Red Polled bull. He is smooth, well covered, and displays more of the beef than the dairy conformation.

The mammary system: Cows of the Red Polled breed do not rate high in either the shape or the function of their mammary sys-

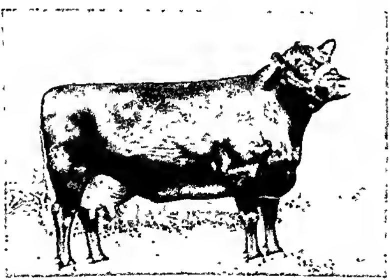


Fig. 19.4 Pictures an excellent cow of the Red Polled breed. She is extremely smooth and well filled in crops and chest. She has many qualities of a well-fitted beef animal but her udder, outstanding in both size and shape, indicates her dairy qualities. She provides an excellent example of a combination of beef and dairy qualities in the breed. *(Courtesy, Red Polled Cattle Club of America.)*

however, to take on flesh readily and smooth up when dry The head of a typical cow is rather large and relatively long in relation to width, the dish in the face is slight

Red Danish cows are inclined to be open in the shoulders with prominent shoulder points Many are rather rough in rump and coarse and high in the tailhead They usually have depth of rib and good width of chest

Figure 19 6 shows a cow of better than average conformation She displays the dairy-like qualities of the breed and has a fairly typical udder Figure 19 7 similarly illustrates a good type Red Danish bull

Udder and mammary system Red Danish cows usually have udders that function well but are not equal to Jersey or Ayrshire udders in shape or form The teats are usually fairly well centered under the quarters, but the floor of the udder is often quartered Quite often the front teats are considerably larger and longer than the rear teats The udders are usually well attached and about average in texture

Uniformity of type One of the characteristics by which the breed is recognized is its uniformity of type In general, the cows are uniform in size and conformation The bulls are usually inclined

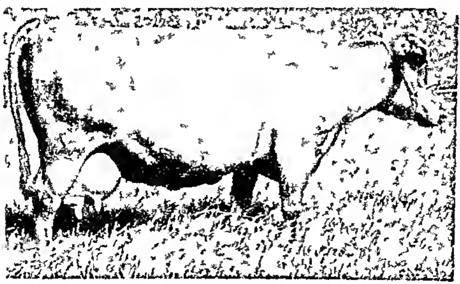


Fig 19 6 This Red Danish cow portrays many of the qualities of the breed She combines dairy qualities, average yield for four lactations 15,607 lb milk and 690 lb butterfat, with many of the characteristics mentioned as being common to the breed (Courtesy, Henry Sobarg, Breese Illinois, and the Danish Breeding Organizations Committee Denmark)

considered average. Heifers are mated to calve when they are from 26 to 30 months of age.

The Minor Dairy Breeds

The term minor dairy breeds as here used refers to breeds that are kept primarily for dairy purposes but that are found in very limited numbers in continental United States. Such breeds are Red Dane, French-Canadian, Dutch Belt, Red Sindhi, and Kerry Dexter.

THE RED DANES

This dairy breed originated in Denmark and has reached its present status largely because of the breed improvement program carried on in that country. In point of time the Red Danish breed is very young. It was first recognized in the show ring in Svendborg,[1] Funen, 1878, as "Red Danish Cattle of Pure Race." If considered as a breed, its average annual yield of milk is quite high, comparing favorably with the production of the Holstein-Friesian, Brown Swiss, and Ayrshire breeds in the United States. This average production is achieved not so much because of extremely high production in a limited number of cows as by uniformly good production and the existence of few poor cows. This implies a high degree of uniformity in the breed in its native home.

General Characteristics of Red Danish Cattle

This breed is horned and red in color. Most of the animals, both male and female, are self- or solid-colored. The shades of color vary from light red to a very deep mahogany shade. White spots on the underline are objected to by breeders.

In size the breed is above average, and the better mature cows are expected to weigh 1100 pounds or above. Bulls weigh 1700 to 2000 pounds. The breed matures rather slowly and compares with our larger dairy breeds in this quality.

Type and general form: The Red Danes are strictly a dairy breed. When milking, the cows are quite lean and dairy-like. They tend,

[1] Ernest L. Anthony, "The History and Economic Development of the Red Danish Milk Race of Cattle" (a manuscript), 1924

The breed is horned, mostly self-colored, and black or dark brown. Occasionally brindles are found. Frequently a fawn ring or band is noted around the muzzle and a lighter strip down the back. Cows may have some white on the underline but self-black or near black is preferred in bulls.

Type and conformation: The breed is slightly larger than the Jersey. The head is somewhat longer and coarser than that of the Jersey, and the shoulders are more open. The topline is rather lacking in straightness, and the rumps are often sloping, rounding off at the tailhead and narrow at the pins. The breed is rather low set and relatively deep in chest and body.

Udder and mammary system: The udders are productive looking but not especially desirable in form. Size of udder is less likely to be a point of criticism than is the shape or strength of attachments. Figure 19.8 shows a dairy herd of four French-Canadian cows, and these show quite clearly many of the breed characteristics including angularity, dairy character, depth, and smoothness. The udder size and shape, teat size and placement of these cows provide a concept of the kind of udder found on the better cows of this breed. Figure 19.9 shows a mature bull of the French-Canadian breed. He possesses extreme dairy qualities.

It should be mentioned that in Canada where the breed originated the name is officially "Canadian." This change was made by the official action of the Canadian Cattle Breeders' Association

Fig 19 8 Shows four cows of the French–Canadian ("Canadian") breed These cows show some similarity to the Jersey breed but lack the quality, smoothness, and udder form displayed by that breed A study of the conformation and udder differences of these four cows reveals many characteristics of the breed

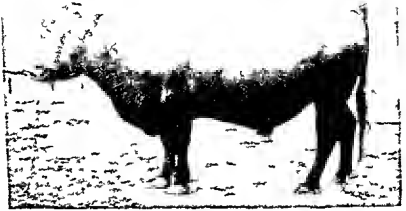


Fig 19 7 This Red Danish sire U S D A. D520 at 4 years 8 months of age when photograph was taken weighed 1865 lb He is smoother, shows somewhat better quality, and is more dairy-like in conformation than most Red Danish bulls (Courtesy, Basil Redmond, President, American Red Danish Cattle Association, Marlette, Michigan)

to be a little thicker in flesh and slightly more stockily built than the cows.

French–Canadian (Canadian)

In the Quebec Province of Canada, some 300 years ago, importations of cattle were made from France These cattle were largely of the Normandy and Brittany breeds From this foundation a breed indigenous to the territory was developed and kept in almost pure form. This proved to be a hardy breed and well suited to the rigorous climate in which it was developed. Since the French–Canadian breed was developed from ancestors that likewise were progenitors of the Jersey and Guernsey breeds, the breed has many qualities of those Channel Island breeds

CHARACTERISTICS OF THE FRENCH–CANADIAN OR CANADIAN BREED

The breed resembles the Jersey breed in size and type more than any other breed of dairy cattle It is strictly a dairy breed and is sometimes called the "Black Jersey" or "Quebec Jersey."

The breed is horned, mostly self-colored, and black or dark brown. Occasionally brindles are found. Frequently a fawn ring or band is noted around the muzzle and a lighter strip down the back. Cows may have some white on the underline but self-black or near black is preferred in bulls.

Type and conformation: The breed is slightly larger than the Jersey. The head is somewhat longer and coarser than that of the Jersey, and the shoulders are more open. The topline is rather lacking in straightness, and the rumps are often sloping, rounding off at the tailhead and narrow at the pins. The breed is rather low set and relatively deep in chest and body.

Udder and mammary system: The udders are productive looking but not especially desirable in form. Size of udder is less likely to be a point of criticism than is the shape or strength of attachments. Figure 19.8 shows a dairy herd of four French–Canadian cows, and these show quite clearly many of the breed characteristics including angularity, dairy character, depth, and smoothness. The udder size and shape, teat size and placement of these cows provide a concept of the kind of udder found on the better cows of this breed. Figure 19.9 shows a mature bull of the French–Canadian breed. He possesses extreme dairy qualities.

It should be mentioned that in Canada where the breed originated the name is officially "Canadian." This change was made by the official action of the Canadian Cattle Breeders' Association

Fig. 19.8 Shows four cows of the French–Canadian ("Canadian") breed. These cows show some similarity to the Jersey breed but lack the quality, smoothness, and udder form displayed by that breed. A study of the conformation and udder differences of these four cows reveals many characteristics of the breed.

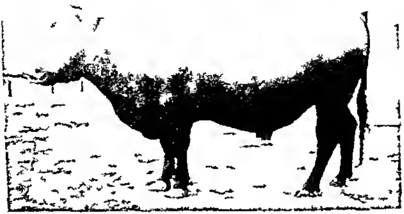


Fig 19 7 This Red Danish sire U S D A. D520 at 4 years 8 months of age when photograph was taken weighed 1865 lb He is smoother shows somewhat better *quality and is more dairy like in conformation than most Red Danish bulls* (Courtesy Basil Redmond President American Red Danish Cattle Association Marlette Michigan)

to be a little thicker in flesh and slightly more stockily built than the cows

French-Canadian (Canadian)

In the Quebec Province of Canada, some 300 years ago, importations of cattle were made from France These cattle were largely of the Normandy and Brittany breeds From this foundation a breed indigenous to the territory was developed and kept in almost pure form. This proved to be a hardy breed and well suited to the rigorous climate in which it was developed. Since the French-Canadian breed was developed from ancestors that likewise were progenitors of the Jersey and Guernsey breeds, the breed has many qualities of those Channel Island breeds

CHARACTERISTICS OF THE FRENCH-CANADIAN OR CANADIAN BREED

The breed resembles the Jersey breed in size and type more than any other breed of dairy cattle It is strictly a dairy breed and is sometimes called the "Black Jersey" or "Quebec Jersey"

The breed is horned, mostly self-colored, and black or dark brown. Occasionally brindles are found. Frequently a fawn ring or band is noted around the muzzle and a lighter strip down the back. Cows may have some white on the underline but self-black or near black is preferred in bulls.

Type and conformation: The breed is slightly larger than the Jersey. The head is somewhat longer and coarser than that of the Jersey, and the shoulders are more open. The topline is rather lacking in straightness, and the rumps are often sloping, rounding off at the tailhead and narrow at the pins. The breed is rather low set and relatively deep in chest and body.

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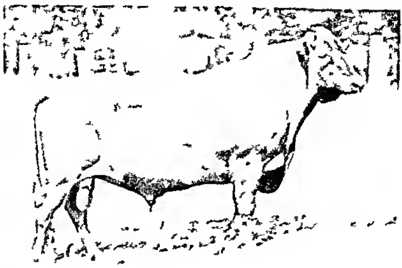

Fg 19 9 This s a super or nd vidual of the French-Canad on breed Th s mature bull has excellent da ry qual t es but lacks somewhat of the smoothness and capacity of our best Jersey bulls

in 1930 More often especially in the United States the name French Canadian is used to identify the breed

The Dutch Belt Breed

The Dutch Belt or Dutch Belted breed is less popular than it was 25 or 30 years ago Economically from a yield point of view and by comparison with other dairy breeds it has little to com mend it The yield of milk is low and the test is also quite low Because of their scarcity however the breed has a novelty or dis play value that appeals to a limited number of persons

Physical Characteristics

The breed is quite dairy like in appearance It is medium in size Mature cows weigh from 1050 to 1300 pounds The most marked characteristic of the breed is the wide belt of white on an otherwise black or very dark brown animal This belt of white en circles the animal and extends from behind the shoulders almost to the hips

Breeds That Have Become Obsolete or Are Relatively New

THE KERRY BREED

The Kerry and Dexter breeds were kept in small numbers, mostly because of their novelty rather than their economic value. The Kerry is a small breed, somewhat smaller than the Jersey. It originated in Ireland and is black in color. It is dairy-like in conformation. In the earlier years, 1910–1915, classes were set up to enable them to be shown at some major shows. A few well-known breeding establishments maintained herds and exhibited them. Because of lack of interest, the sponsoring associations were discontinued.

THE DEXTER BREED

This breed, if it can be properly called one, is characterized by extremely short legs and diminutive size. The udder is usually small but fairly deep and very low to the ground. Genetically the breed is the victim of lethal abnormality known as "bull dog."

THE RED SINDHI BREED

This breed is indigenous to India. It was recently imported to this country by the United States Department of Agriculture, primarily to cross with other dairy breeds. Its advantages for this purpose are its disease resistance and especially its ability to tolerate high temperatures. Figure 19.10 shows a high-record Sindhi cow in her native home, India.

Physical characteristics: The Red Sindhi is slightly larger than the Jersey and reddish fawn in color. It is a horned breed and possesses a rather large hump at the top of the shoulders. The hump is somewhat more pronounced in bulls than in cows. The breed is also characterized by a very heavy dewlap and loose skin, especially in the neck region.

This is strictly a dairy breed but is lacking in the lactation drive

Fig 19 1D Shows a portion of the Allahabad Agricultural Institute herd at rest The cow in the foreground is considered to be the best specimen of the breed in that herd Sindhi Queen, the cow referred to has a record of 8,505 8 lb milk in a 421 day lactation The breed is characterized by a pronounced hump, a very sloping rump, and an enormous amount of loose skin hanging from the throat to the breast This cow weighed approximately 900 lb (Courtesy, Professor M H Alexander, University of Illinois)

that is characteristic of our major dairy breeds The udders on mature cows are inclined to be small in size and lack the form and shape characteristic of dairy breeds

In their native home, the Red Sindhis have a relatively low average milk yield In 1952 and 1953 the average yield of the purebred Sindhi cows in the Allahabad Agricultural Institute herd was 4303 pounds milk. The average butterfat content of Red Sindhi milk is approximately 4 5 per cent.

chapter **20**

Forecasting type and production or prediction judging

Every time that an animal with some prospects for a productive future is purchased, or a decision is made to sell or retain some member of the herd, a certain amount of forecasting is done. Forecasting or prediction judging deals with the future of an animal. The future is extremely important in dairy cattle husbandry. Few dairy cattle breeders are successful unless they have some ability to foretell the prospects that lie ahead of a heifer or what the future holds for a young cow or bull.

It is in this area of judging that a profound knowledge of dairy cattle is most helpful. It is the realm in which experience is a great teacher. It is in this field that the real students of cattle are separated from the ordinary dairymen. It is the sphere in which the best and most successful purebred dairy cattle breeders are to be found.

Areas Where the Ability to Predict Is Most Helpful

This type of judging is most helpful where measurements of production or type are not available. This would be true of the calf or heifer, the untested young cow, the thin or depleted young cow,

the overfatted heifer, and the animal in which certain types of defects are present *Aside from the evaluation of defects, a topic* rather thoroughly discussed in Chapter 13, perhaps the young heifer and the animal that has been poorly managed provide the most favorable and most desirable subjects for forecasting their future

An Estimate of the Potentiality of Heifers

There are four basic questions that require an answer in foretelling the probable future development of the dairy calf or heifer We need to know (1) Will she develop to proper size, and will her conformation be such that it can provide good eye appeal? (2) Will she have sufficient lactation drive or dairy tendency? (3) Is she strong and full enough in chest with enough spring and depth of rib to make her a good feeder and capacious? (4) What will be the shape and capacity of her udder? We no longer need to answer these questions solely on the basis of empirical information For considerable research has been directed toward finding an answer to these and other problems in heifer selection

Foretelling Size and Conformation at Maturity

Potentially, the heifer is most valuable because she is expected to become a cow Therefore, we are extremely interested in knowing what kind of cow she is going to be It has been repeatedly pointed out in the show ring that calves which have been successfully exhibited as such seldom develop into outstanding cows. There are, of course, a few notable exceptions as Honeybloom of the Prairie, a Guernsey, Triune Papoose Piebe, a Holstein, and Sociable Sybil, a Jersey, but, in general, the criticism is valid The question then, simply put, is Why is this so?

The answer is not simple and usually prompts more questions For example, have we been selecting the kind of calf in the show ring that is the one most likely to grow into a good cow? Does the calf fail as a cow because of body conformation, dairy qualities, or udder shape? Have we any evidence to show what kind of a calf or heifer is most likely to grow into an acceptable cow? Answer these questions, and the problem itself tends to become somewhat less of a puzzle

The matter of size is relatively simple We have growth norms for bulls and heifers of the several breeds These are presented in

Chapter 6. The better animals are, for the most part, above average for their age. In fact, in size they usually appear in the upper quartile (one fourth) of the group or class in which they are included.

The problem of type and conformation is less simple. Our show-ring standards have required too much depth of body and the appearance of maturity in our young females. This has favored the early-maturing animal that seldom grows into the large, roomy cow that is preferred. Furthermore, to enhance this appearance of depth and capacity, we have exhibited our younger females in too high a condition. This overconditioning puts too much adipose (fatty) tissue in the udder, over the back, and on the pinbones, all of which is not favorable to future development. Fortunately, exhibitors are beginning to recognize and judges are supporting the view that young females should not be overconditioned. This view is extremely important and will, if conscientiously followed, aid in developing better cows from our most likely-looking heifers. But this is not the complete solution to this problem.

The best cows usually develop from the rather angular, more upstanding, and later-maturing calves and heifers. A splendid example of this is found in the progeny of the great Jersey sire, Brampton Standard Sir. His daughters, by show-ring standards, were so unpromising as calves and beifers that the bull was taken out of service for a year. When his daughters came into milk, however, they were quite outstanding, and it was then realized that a great mistake had been made in taking the bull out of service. Figure 20.1 shows this bull and eight of his excellent daughters.

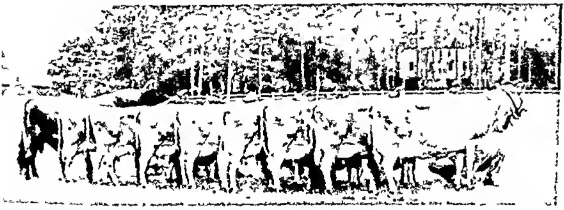

Fig. 20.1 The Jersey bull, Brampton Standard Sir, and eight of his excellent daughters The daughters of this bull were slow in maturing but made splendid mature cows. He was one of the great sires of the breed.

The point being made is that in selecting calves and heifers to become cows in the herd, choose those that are somewhat slow in maturing, slightly upstanding, but full in chest, strong in topline (even if they roach somewhat at the loin), and that utilize their feed for growth rather than laying on fat. Then, if they are clean in head and neck, with a good teat size and placement, the prospects are quite favorable for them to become good cows.

Foretelling Lactation Drive

There is a consistency in the life cycle of an animal that tends to portray its future. Lactation drive is of genetic origin, as are many other characteristics of an animal, but it is not easy to forecast in the earlier stages of the development of a calf or heifer.

The value of the pedigree at this point should not be overlooked, and various devices in the nature of indexes or formulas have been developed that possess some value in forecasting dairy qualities. Perhaps the most discussed physical approach to this problem is udder palpation.

Heifer Udder Palpation

The reasoning or hypothesis upon which this project is based holds that the genes responsible for lactation drive are operative and active in the developing animal. Thus a heifer calf with high production potential will lay down mammary tissue at an earlier age and in greater amounts than calves or heifers less favorably endowed. In other words, there is a correlation between the age at which mammary tissue is first laid down and the yield in the same animal when in milk. Furthermore, there is likewise a correlation between the amount of tissue measured or evaluated at a given age and future production.

A number of experiments have been conducted to test the validity of this concept. The idea and the method were developed by W. W. Swett of the United States Department of Agriculture, and the people at Beltsville have done a great deal of udder palpation work. Experiments have also been undertaken at Illinois, Wisconsin, Ohio, Purdue, and elsewhere.

Table 20.1 analyzes and summarizes the results obtained in the Illinois[1] project for the first seven years of its operation.

[1] W W Yapp, W M. Dillon Jr., and W R. Smith, Udder Palpation in Heifers as a Basis for Estimating Their Milk Yield as Cows, *J Dairy Sci.*, 38(6), 617, 1955

TABLE 20 1 Within-Breed Correlations with Values as Indicated

	Palpation Scores					Weight			Height			Milk and Fat Yields		
	2	3	4	5	6	7	8	9	13	14	15	10	11	12
	4 Mo	6 Mo	8 Mo	Age When Max Score Attained	Age When Max Tissue First Laid Down	3 Mo	6 Mo	8 Mo	3 Mo	6 Mo	8 Mo	Act Milk Yield	Act Fat Yield	305 day 2 × M E FCM
Palpation 1 3 mo	0 79**	0 58**	0 45**	−0 60**	−0 35**	0 20**	0 22**	0 20**	0 15*	0 24**	0 20**	0 10	0 02	0 11
Palpation 2 4 mo		0 70**	0 49**	−0 70**	−0 19**	0 10	0 18**	0 17*	0 19**	0 25**	0 21**	0 10	0 06	0 14*
Palpation 3 6 mo			0 76**	−0 85**	−0 17**	0 08	0 15*	0 18**	0 03	0 15*	0 18**	0 01	0 00	0 01
Palpation 4 8 mo				−0 75**	−0 10	−0 03	0 14*	0 16*	0 01	0 14*	0 16*	0 00	0 00	−0 01
5 Age When Max Score Attained					0 08	−0 02	−0 14*	−0 16*	−0 04	−0 16*	−0 20**	−0 09	−0 05	−0 07
6 Age When Max Tissue First Laid Down						−0 24**	−0 14*	−0 06	0 08	0 04	0 06	+0 01	0 03	0 09
Weight 7 3 mo							+0 62**	+0 48**	0 30**	0 40**	0 34**	−0 02	−0 02	−0 03
Weight 8 6 mo								+0 74**	0 23**	0 62**	0 49**	+0 03	0 04	0 06
Weight 9 8 mo									0 16*	0 42**	0 53**	−0 12	−0 08	−0 04
Height 13 3 mo										0 49**	0 41**	0 05	0 09	0 21**
Height 14 6 mo											0 68**	0 06	0 07	0 10
Height 15 8 mo												0 03	0 01 -	0 04
10 Act Milk Yield													+0 87**	0 87**
11 Act Fat Yield														0 90**

All height and weight measurements and fat corrected milk
$R^2 = 0.07$, $R = 0.27$

All palpation scores and fat-corrected milk
$R^2 = 0.05$, $R = 0.23$

All height at wither measurements and fat-corrected milk
$R^2 = 0.05$, $R = 0.23$

* Significant at 5% level
** Significant at 1% level

In this experiment the within-breed correlation between fat-corrected milk (FCM) and the palpation score† at four months of age was $r = 0.14$.* The within-breed correlation between height at withers and fat-corrected milk yield was $r = 0.21$.** The within-breed correlation between body weight at three months and palpation score at three months was $r = 0.20$.** Other correlation values and their significance may be read directly from the table.

Other research workers have found somewhat higher correlations. For example, Swett, Book, Mathews, and Fohrman,[2] working at Beltsville, report that 222 animals of the Holstein-Friesian breed palpated at five months of age showed $r = 0.2413$** and for an equal number of Jerseys at four months of age $r = 0.1872$** as the coefficient of correlation between stage of development and milk production in the first lactation. They also reported values of $r = 0.3627$** and $r = 0.4408$,** respectively, between body weight and palpation grades.

What then is the significance of these studies, and how may this information be used? Opinions differ somewhat on these points, but it appears that the following, in light of present information, are valid observations:

1. That the palpation of heifer udders has some value in forecasting the milk yield of that animal when in production.
2. That four to five months of age (depending upon breed) is the most desirable time in the life of the animal to palpate the udder.
3. That there is a significant and somewhat higher correlation between the weight of an animal and palpation grade than between palpation grade and milk production, thus indicating that larger animals possess larger and better developed mammary systems.

† The palpation technique used in this project was to examine each quarter of the udder separately on each palpation date. The examination included the determination of the size of the developing glandular tissue beginning before any tissue was laid down and continued until it was approximately even on each side of the udder and the union between the front and rear quarters was complete. Examinations were begun when the calf was two weeks of age and continued at two-week intervals. The rating system used expressed degrees of growth from 0 (no development) to stage 8 (development complete as indicated).

At 3 months of age the heifers were weighed and the following measurements taken: (1) heart girth, (2) length of body, (3) height at withers, (4) depth of chest, (5) width of chest, (6) width at hooks, and (7) width at pinbones. Weights and the seven measurements were made at 3, 6, 8, 10, 12, 15, and 18 months of age.

[2] W. W. Swett, J. H. Book, C. A. Mathews, and M. H. Fohrman, Evaluation of Mammary-Gland Development in Holstein and Jersey Calves as a Measure of Potential Producing Capacity, *U.S.D.A. Tech. Bull. 1111*, 1954.

4. That there is essentially the same correlation between size and milk yield and height at withers and milk yield as there is between palpation grade and milk yield.

5. That the larger heifers at a given age (4 to 5 months) are the better prospects in production and that the higher palpation grades at those ages are also indicative, and to a similar degree, of productive capacity.

In general, it might be concluded that there is some gain, but not much, in palpating heifer udders to estimate their milk yield potential. It is doubtful if a breeder would find it profitable to adopt the heifer udder-palpation program.

Forecasting Udder Form or Shape

The morphology (form) of the developing, rudimentary udder in the heifer provides material for an interesting study. The solution to this problem has also been sought experimentally.[3] Figure 20.2 shows positive molds made of heifer udders when the heifers were 8 to 12 months of age. Figures 20.3, 20.4, 20.5, and 20.6 show how these molds were made. The first of these figures (20.3) shows the metal form used to obtain the negative mold of the heifer udder. Figure 20.4 shows this mold in position while the especially prepared plaster of Paris was changing from the liquid to a solid form (time 5 to 8 minutes). Figure 20.5 shows the negative plaster-of-Paris mold removed from the form, and Figure 20.6 shows the positive mold just as it was removed from the negative form. The positive mold is, of course, a facsimile of the heifer udder when the mold was made.

With the mold to constitute a record, it was then possible to compare the mold made of the immature udder with the udder of the same cow when in milking form. The correlation between the two thus provided the gage by which the heifer udder may be used to forecast the form of the milking udder in the same animal. Using this method, molds were made of the udders of 17 heifers, and these were compared with the udders of the same animals when in milk. In all, 19 values or measurements were compared.

Of the 19 values or measurements made and compared, 17 of them showed a positive correlation between the mold and the milking udder. Although the number of heifers studied was too small to ex-

[3] William Harlan Jenner, The Morphology of the Undeveloped Mammary Gland as a Criterion for Forecasting Udder Form in the Cow, M S Thesis, University of Illinois, 1954

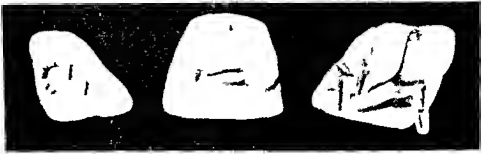

Fig 20 2 Udder molds of three different heifers At maturity the udder on the right was badly quartered and very rough on the floor The teats were large and badly shaped The udder classed as undesirable

The udder in the center was poorly developed in front very uneven in development of front and rear udder The teats were small, and the cow lacked production

The udder on the left proved to be highly desirable The udder was shapely the teats well spaced and centered under the quarters, and the quarters were well balanced The udder was highly desirable and would have been excellent except for the lack of height and width of rear attachment

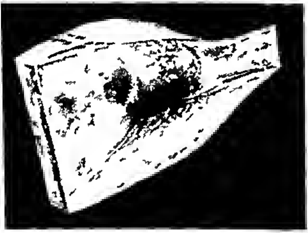

Fig 20 3 The metal form designed to hold plaster of paris while negative mold is being made

Fig 20 4 The mold in position and ready for the plaster of paris

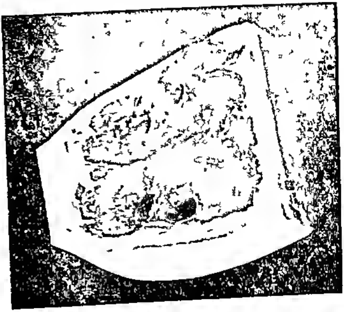

Fig. 20.5 The negative mold after the plaster of paris had hardened and the mold had been removed from the metal container.

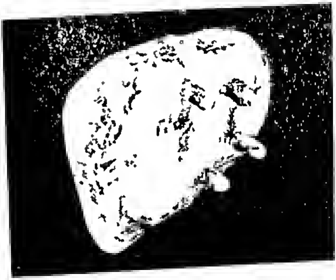

Fig 20 6 The positive mold or facsimile of the heifer udder just as it had been removed from the negative mold and before sanding and painting

pect mathematical significance, since it required a value of $r = 0.482$ to be significant to the 5 per cent level and $r = 0.606$ at the 1 per cent level, the consistency and amount of the correlations give credence to the view that the immature udder bears considerable relation to the milking gland. The highest correlation found was in teat length which was $r = 0.588$ for the front teats and 0.345 for the rear teats. The depth of crease between the two halves of the udder showed $r = 0.4543$, a rather high value and consistently observed. In width of udder the correlation was $r = 0.286$ between the average width of mold front and rear quarters and the width of the milking udder. Distance between the front and rear teats same side of udder on the mold and functioning udder $r = 0.2209$.

In an effort to set up a combination of all values, a score card was developed and used on the mold and the functioning udder by three separate, highly experienced judges The correlation between the average scores was $r = 0\ 1138$ The scores for the molds were then correlated to the highest single day's milk production, and this value was $r = 0\ 1323$ The negative correlations were (1) length of udder, and (2) slope of udder, neither were approaching significance

It is readily recognized that this study does not provide conclu sive evidence, but it does indicate that more probably than not the heifer udder has value in portraying the morphology (form) of the milking udder in the same animal

If we have learned anything of value in predicting from a heifer what the cow will be, it probably would be summed up in these statements

Body size Other factors remaining the same, calves and heifers that are above the average in size make the best prospect for milk ing animals

Rate of maturity In general, the slower maturing heifers, perhaps slightly upstanding but strong in chest and topline, that show quality and are clean about the head and neck make the best cows

Development of mammary tissue The deposition of a large amount of mammary tissue, particularly adipose (fatty) tissue is undesir able in the heifer since there appears to be a negative correlation between large udder size in a first calf heifer and sustained high production for several lactations

Teat size and placement The teat length in the calf is highly in dicative of teat length in the cow Furthermore, small bore, pen cil like teats, even though of acceptable length in the heifer are usually indicative of a lack of productive ability in the cow

For photographs of desirable udder form in heifers, refer to Chapter 21

Forecasting the Future of Thin Animals

Heavy producing young animals that are very thin in flesh are usually better and have more outcome than the average dairyman considers them to possess Such animals appear frail and rather rough in general appearance Condition smooths them up, gives them more apparent capacity, and improves their eye appeal A

dealer expressed it this way: "Fat is a good breed," meaning that it added to the sale value of the animal. Buyers who recognize the potential in a thin animal usually get the best bargains.

There is, of course, the other side of the situation. A well-fitted animal that is ready to calve within two or three days or that has been milking for two or three weeks is at its best. It probably will never look any better in that lactation. Such animals usually have eye appeal and sell well.

chapter 21

Evaluating and judging the dairy heifer

The term "heifer" merely identifies a certain developmental stage in the life cycle of a cow A heifer thus is less important to a dairy man or breeder for what she is than for what she is expected to become The breeders' problem then is largely one of foreseeing or predicting from the conformation and characteristics of the heifer her most probable development when she reaches mature form On the whole, we have not been highly successful in attaining com petence in this area of judging This is attested by the failure of the majority of heifers that are highly successful in the show ring to repeat their success as milking cows

There are, however, sufficient exceptions to this general situa tion, and enough is known about prediction judging (discussed in Chapter 20) to provide encouragement to breeders and judges who wish to learn more about heifer selection It is a great asset to a breeder to be able to choose wisely, from among a large group of heifers those animals that have the highest probability of becom ing better than average cows This competence enables him to provide better herd replacements at lower cost and may even fore stall a year or two of wasted service to a worthless sire

Heifers Should be Judged as Cow Prospects

The qualities of a heifer that lead one to conclude that she will become a good cow are basically the same, whether the animal is viewed as a herd replacement or a show-ring prospect. More recently judges at our major shows have come to a recognition of this fact, and a type of heifer with better prospects for production predominates in the show ring than prevailed 20 to 30 years ago.

Growth in Relation to Age

Desirable heifers are well grown for their age. Furthermore, their inheritance should lead one to expect better than average genetic size. Although size is a valued quality in heifers, and the more desirable heifers are usually found among the upper one fourth of all of the heifers of a given age and breed, other qualities are also highly important.

Desirable Conformational Qualities

We have always insisted that a good dairy cow must possess an angular dairy-like form. Conversely, a beefy, thickly covered, short-bodied, short-necked cow has been rated very poor as a dairy prospect. But we have not been equally critical of or applied the same standards of dairy-like conformation to our dairy heifers.

Until 20 to 25 years ago, heifers were judged to be highly desirable, especially in certain breeds, if they were deep-bodied, smooth, highly conditioned, and, worst of all, perhaps showed a great deal of udder, most of which was adipose (fat) tissue. Such heifers were early-maturing and lacked dairy qualities and lactation drive. Furthermore, the overconditioning required for success in the show ring acted adversely upon any dairy qualities they did possess. The almost total failure of such heifers when they reached the milking line gradually led to a more valid concept of the qualities that a dairy heifer ought to exhibit.

Figure 21.1 shows an overconditioned heifer that was almost ruined because she was overfat at calving time. Note the contrast between this animal and the heifer portrayed in Figure 21.2. The latter heifer came into milk without having been overconditioned. In consequence, she freshened without excess fatty tissue in her

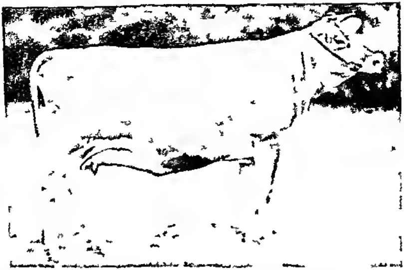

Fig 21 1 This heifer by present standards is much overconditioned She is too thickly covered with flesh shows a fatty deposit at the throat, has become patchy at the pins and has an overdeveloped udder badly infiltrated with fatty tissue In this case an otherwise good heifer is almost ruined for future use

Fig 21 2 *Compare the condition of Jester s Advancer Fan, a junior yearling that* was junior champion at the 1952 Dairy Cattle Congress with that of the heifer in *Fig* 21 1 This heifer has enough condition to show her smoothness and capacity but is not overdone See Fig 21 9 to learn the kind of cow she became at maturity

udder, made a good production record, and was later officially classified excellent.

The first major gain in heifer judging was made by tabooing overcondition. Dairy heifers under this newer concept were supposed to look like dairy heifers and not like the overfatted animals that had previously been preferred. It was under this concept that it was no longer objectionable in the show ring for the ribs to show up prominently on a dairy heifer. In fact, leanness and quality came to be regarded as a virtue, a valued asset, especially to the future favorable development of the animal.

This was a great advance in heifer development. With this kind of management, fatty tissue was no longer deposited in the developing udder. After calving, the udders of heifers handled in this manner took on a more desirable form, functioned much better, and lasted longer. Furthermore, the animals were no longer patchy about the pins, there were no rolls of fat over the back, the shoulders were sharper, and the animals displayed the dairy form required in milking cows.

Rates of Development and Time of Maturity

Heifers that have the best prospect of becoming good and durable cows usually mature rather slowly. Stated another way, although well grown, probably even taller than the average heifer of the breed when age is taken into account, such heifers look younger than they actually are. They may also give the impression of being slightly upstanding and may even lack somewhat in depth of body. But such heifers continue to develop in both scale and capacity, and they are usually slow in maturing and thus older when their full maturity is attained. In these slower-maturing animals, the maximum single lactation production usually occurs when the animal is nine years of age instead of at seven years which is approximately average for most of the breeds of dairy cattle. Figure 21.3 shows an early-maturing, deep-bodied heifer of the type that seldom develops into an economical and durable producer. More often heifers of this type lack lactation drive and often leave the herd by the time they have reached their second or third lactations. Figure 21.4 shows a heifer possessing the slower-maturing, more dairy-like form that is now much more highly favored in a good cow prospect.

Fig 21 3 *This is an early maturing short-coupled deep-bodied heifer She is very* well developed for her age Usually this kind fails to reach the size and scale of a slower matur ng animal This heifer produced almost as much as a first calf two-year old as she did in any of her later lactations

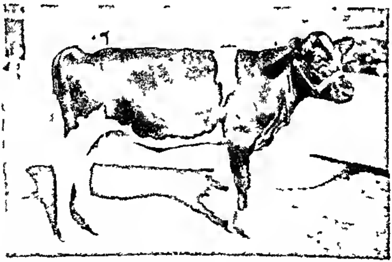

Fig 21 4 A younger he fer than the one shown in Fig 21 3, but she is a different type This heifer is more open ribbed and a longer he fer She is the slower *maturing type Heifers of this type tend to mature slowly, look younger than they* are and grow into large durable cows They usually increase in production with each lactation unt l they are 8 or 9 years old

EVALUATING THE HEIFER UDDER

By what standards should a heifer's udder be judged? The answer to this question is reached by a study of the research approach and through the combined experiences of many highly successful breeders. The research approach through udder palpation and morphological studies of the developing udder will be found in Chapter 20. The breeder's view, supported at least in part by research, has lead to these basic conclusions.

Valid clues to future udder development are to be found in the following three characteristics. A desirable udder in the heifer usually has (1) teats of good size and length, (2) an udder of good width, and (3) the udder and teats placed well back between the hind legs.

Teat placement: It is desirable that the front and rear teats on the same side of the udder be centered under the quarters of the udder and separated by from one and one-half inches in the calf to from three to four inches in the older heifer. The desired spacing will depend to some extent on the breed of animal. The front teats should hang plumb and be reasonably close together. If there is too great a distance between the front teats, the fore quarters will tend to be rather wide apart when the animal comes into milk, the rear udder will be narrow, and the udder will tend to bag in front of the rear legs instead of back between them as it should.

It is usually better for the rear teats to be centered properly under the quarters but point slightly toward each other at the tip rather than to hang perfectly plumb or straight down. If rear teats show this quality (that is point toward each other) in the heifer, the median support of the udder will usually be strong and the rear udder will have more width and possess a better shape when the animal comes into milk.

Figure 21.5 shows a heifer with a good prospect for a desirable milking udder. It possesses the qualities described above. Figure 21.6*a* and *b* show a poor prospect for udder development. In this case, we anticipate that the teats will be poorly shaped, that the udder will be narrow in rear attachment, lack quality or texture, and be poorly shaped. There are, of course, many other possibilities in udder shape that would fall between these two types of heifer udders.

Width of udder in the heifer: The anatomy of the heifer should be such that there is ample distance between the legs to carry an

Fig 21 5 This heifer s udder possesses many of the qualities associated with favorable prospects for a desirable mature udder The teats are fairly well placed, they are of sufficient size, they hang plumb, and the udder is located well back between the hind legs with ample room for development There is neither too little or too much mammary tissue for a heifer of this age, size, and condition

Fig 21 6a This heifer is a poor prospect to have a well shaped milking udder The rear attachment is narrow, the mammary tissue consists of separate and badly shaped quarters The teats are large and poorly shaped and they are much too close together The udder appears to be poorly attached and would be expected to bag in front of the hind legs when the animal is of m lking age

Fig 21 6b The udder of this heifer appears to lack quality The teats, when viewed from the side, are much too close together An udder with the form and teat placement shown here cannot be expected to have either good form or productive capacity when the animal comes into production

udder of reasonable width Udders with good width gain their capacity by widtb rather than extreme depth Wide udders are seldom as deep as narrow udders, and their attachments are usually stronger Furthermore, such udders are less likely to be injured, and tberefore last better than deep, loosely attached udders

Figure 21.7 shows a heifer with good width between the hind legs, and the prospects are that she will have a wide, if not too shapely rear udder when mature.

Position of udder on the body: The point of attachment of the udder to the body of an animal has a great deal to do with the shape and durability of the udder. If the udder is located too far forward, in milking form it will usually be wide in front, narrow in the rear, with a low and narrow rear attachment, and when filled will hang in front of instead of back between the rear legs. Udders of this type are prone to injury, and are often responsible for the removal of an otherwise desirable cow from the herd before she has reached full maturity. In panel Figure 21.8 three heifers are shown. All these heifers developed into outstanding milking animals that were highly successful in the show ring.

You will note that, although all these heifers are standing side view, with the rear leg on the camera side slightly back, in no case are the teats visible. The reason they cannot be seen is that they are located well back on the body and between the hind legs. Panel Figure 21.9 shows the udder of each of the same three animals when they were successfully exhibited as milking cows. Note that these udders are well located between the hind legs. Figure 21.10 shows a heifer with teats located too far forward on the body. You

Fig 21.7 This heifer has a wide rear udder with good height and width of rear attachment. The teats are well centered on the quarters, and the udder has good texture. There is good width between the thighs, but the rear udder slopes up too sharply from the base of the teat to expect the milking udder to be full and well rounded in the rear.

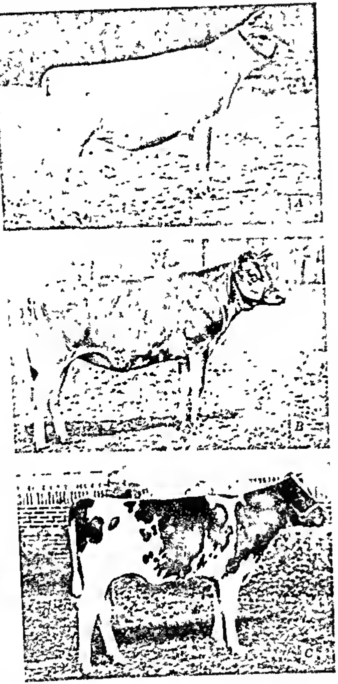

Fig. 21.8 These three heifers all developed into outstanding cows. They are (A) Jester Advancer Fan, (B) Sociable Sybil, and (C) Triune Papoose Piebe. In all cases these heifers have udders that are located well back between the hind legs. Furthermore, none of them, although they were in very good physical condition, show much udder development at the ages pictured. (See Fig. 21.9.)

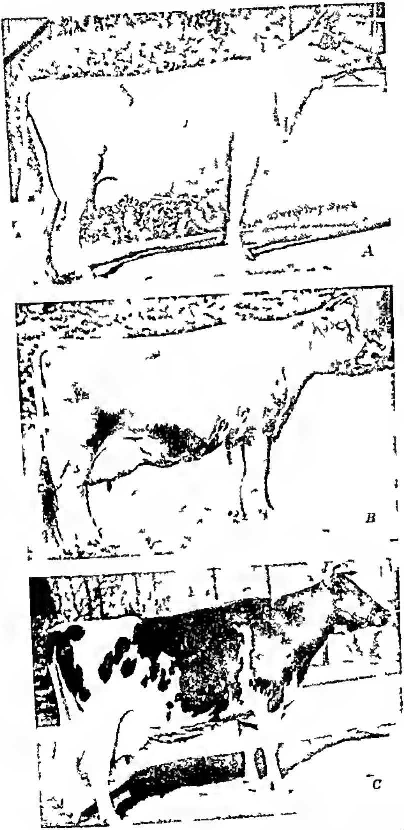

Fig 21 9 These are the cows that the heifers shown in Fig 21 8 developed into
The cows are arranged in the same order as the heifers in Fig 21 8 These are all
great cows and rate among the best of the breed they represent All made excellent
production records and all have been highly successful in the show ring

Fig 21 10 The udder of this heifer is located too far forward on the body All four teats are plainly visible (compare with the heifers shown in Fig 21 8) Furthermore, this udder lacks quality and indicates that it possesses an excess of adipose (fatty) tissue The teats are uneven in length and size, and the udder does not forecast heavy production when the animal reaches milking form

will note that all four teats are clearly visible when the animal, standing in essentially the same position as the heifers in Figure 21 8, is viewed from the side. Heifers of this type usually have their udders extending too far forward to become highly desirable durable cows

Eye Appeal in the Dairy Heifer

Perhaps there is more difference, between heifers that are chosen for exhibition in the show ring and those that are selected to become good mature cows for herd improvement, in eye appeal than in most other characteristics This is largely true because from

stage to stage animals tend to change during the growing-up process. For example, an animal that is perfectly straight in top-line when a calf or heifer may become low in the loin when mature. On the other hand, a heifer that is somewhat down at the pins and strong in the loin often will be straight in top-line as a cow. A growthy, rather slow-maturing heifer may lack depth of body as a young animal but have plenty of depth when sbe becomes a cow. By contrast, a very deep-bodied, mature-looking heifer may not grow sufficiently in her later years to become a large powerful cow.

What we are saying is that the standards by which heifers are judged in the show ring are still slightly different from those used to choose a herd replacement. The two procedures are much more alike than they were 20 to 30 years ago, but capacity and condition still rate higher in the show ring than they do in the barn lot or pasture.

It should be made perfectly clear, however, that the basic characteristics of the animal such as (1) dairy tendency or qualities (2) strength of chest, well-filled crops and well-attached shoulders, (3) good feet and legs, (4) good udder prospects, and (5) smoothness and eye appeal are as fundamental to a heifer as they are to a cow. They must, accordingly, be present in all good heifers.

chapter **22**

Judging and selecting dairy bulls

The phenotype of a dairy bull discloses less of his genotype for production than that observed for any other class of livestock. The selection of dairy bulls on the basis of phenotype (physical characteristics), therefore, poses a difficult problem. Although the bull is as capable of transmitting milk production potential to his daughter as is the cow with which he is mated, he does not produce milk and cannot be sampled or tested to directly evaluate his competence. If his genotype for milk production is to be measured at all, it must be through his daughters' yield, usually in comparison with that of their dams.

Perhaps one of the strongest arguments supporting the idea that the function of milk production induces dairy appearance in a milking cow resides in the dairy bull. Since he does not yield milk, it is not essential that he look as much like a dairy animal as a cow is expected to, in order to transmit that quality. In other words, his phenotype does not need to be highly correlated with his ability to transmit dairy qualities to his daughters. Probably as good an example of type and dairy quality differences between bulls and cows as can be found is in Holland Holsteins. Figure 22.1 shows a picture of two very highly regarded Holland bulls. Note how

beefy looking these animals are, how short and compact they appear, and how thick and heavily fleshed in the thighs. By contrast note the panel of three Holland Holstein cows, Figure 22.2. These cows were sired by bulls of essentially the same type as the bulls shown in Figure 22.1; yet they are very dairy-like in appearance and have relatively high records for milk and fat production.

This contrast between bull and cow types illustrates two rather basic facts: (1) If an animal does not perform a function but transmits it, its phenotype and genotype can be somewhat divergent. (2) For selection in bulls to be meaningful, it must involve other criteria than simply physical conformation. In fact, physical conformation only is not a very valid criterion for evaluating the bull's genotype for transmitting productive capacity to his daughters.

This should not be interpreted as implying that the physical characteristics of a bull are not important in evaluating the animal as a sire. His size, his skeletal structure, his legs, pasterns, etc., together with his type are all transmissible to his progeny.

It is not the intention of this discussion of bull selection to deal with pedigree selection, bull proofs, or other well-known criteria by which a bull's genotype for production may be evaluated. Rather will we here concern ourselves with the type, conformation characteristics, soundness, and visible qualities of the animal.

BULL JUDGING IS MORE EMPIRICAL THAN THE JUDGING OF A COW

Score-card standards for bull selection are more difficult to set up and justify than similar standards for dairy cows (Fig. 22.3). Bull score cards have apparently been developed on the assumption that a bull should be judged as though he were a cow devoid of a mammary system. The consequence has been that the 30 points normally alloted to mammary development in the cow have been assigned in the bull score card to dairy character, 15 points, and legs and feet, 15 points. The result has been that currently 35 points in the bull score cards of the Purebred Dairy Cattle Association have been allotted to dairy character in an animal that does not milk at all, against only 20 points to dairy character for the cow which alone produces milk. This might be justified if the correlation between dairy type as judged by the physical characteristics of the animal and his ability to transmit the quality is higher in bulls than it is in cows. But the evidence definitely does not confirm this view.

Fig 22 1 These two Holste n bulls portray quite clearly the type of bull that is preferred in Holland Note that these bulls have a more compact look are much more thickly covered w th flesh and have a more beefl ke appearance than our Holste n bulls Now observe the kind of cows they s re as shown in Fig 22 2

Fewer points to evaluate in the bull The bull must be judged upon fewer characteristics than the cow The only possible physical evi dence of the mammary system, so important in the cow, is his rudimentary teats and rudimentary milk veins Neither of these has been definitely correlated with his ability to transmit a good mammary system to his daughters Since the bull has fewer parts to judge, more weight should be placed upon those points that are meaningful in judging—points that relate to his success as a sire.

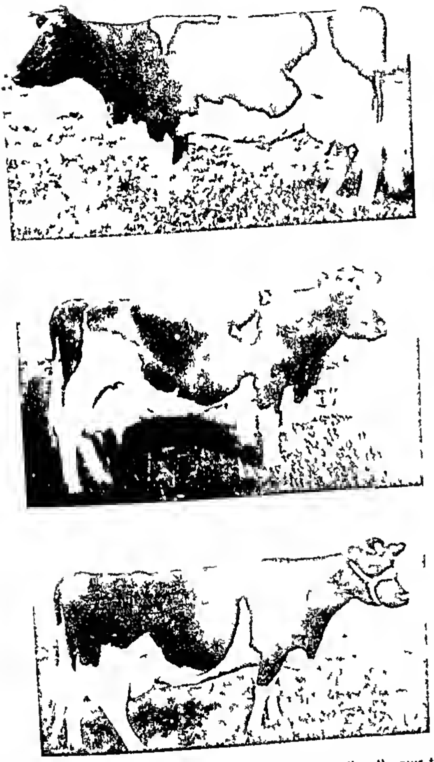

Fig 22 2 Here are shown three Holstein (Friesian in Holland) cows that are very highly regarded in Holland Note the contrast between the compact and short coupled bulls in Fig 22 1 and these three very dairy like cows These cows were, however, sired by bulls similar in type to those illustrated This example clearly illustrates that the phenotype of cows and bulls in the same area can be vastly different

BULLS ARE EVALUATED UPON CONFORMATION, BREED TYPE, SOUNDNESS, AND EYE APPEAL

There is considerable difference of opinion on whether or not dairy bull judging in our major shows has had any really beneficial effect upon the improvement of dairy cattle The reasons most frequently mentioned in support of this view are (1) That the most successful bulls in the show ring are seldom the best in service In other words, bulls much less desirable in conformation tend to sire progeny that rate as more acceptable (2) That the fitting and exhibiting of a bull on the show circuit usually takes him out of service for from six to eight months

It ought to be emphasized, however, that the conformation, breed type, soundness, and especially eye appeal of bulls as well as cows currently exhibited are superior to that of those shown 30 to 40 years ago This would tend to indicate that selection for type has improved the conformation of both bulls and cows

Points to be emphasized in bull selection The phenotype of a bull is correlated to the phenotype of his daughters This point was discussed in Chapter 3 It was shown that bulls rated excellent in type transmitted about 4 5 points more to their daughter's type rating than bulls rated good transmitted to their daughters Stated another way, excellent bulls sired daughters that rated 84 5 in classification, whereas bulls rated good sired daughters that rated 80 1 in classification The difference in type rating of the dams in this study was only 0 8 of a point

HERD BULLS SHOULD HAVE DESIRABLE CONFORMATION

It has been shown that there is a positive correlation between the type of a bull and that of his daughters Therefore, it is desirable for the improvement of the type of the herd that the sires used have good conformation If this is done for several generations, and selection is practiced in the herd, there will be a measurable improvement in type

In judging and especially in herd classification, bulls are evaluated in terms of a score card that is used very much as the cow score card is when applied to judging cows Figure 22 3 reproduces the score card adopted by the Purebred Dairy Cattle Association.

DAIRY BULL SCORE CARD

Ideals of type and breed characteristics must be considered in the application of the terminology of this score card

Based on Order of Observation		Perfect Score	Bull A	Cut in Score	Bull B	Cut in Score
1. GENERAL APPEARANCE *Attractive individuality revealing vigor, masculinity with a harmonious blending and correlation of parts. Impressive style and attractive carriage with an active well balanced walk* BREED CHARACTERISTICS (see below) HEAD masculine medium in length clean-cut broad muzzle with large open nostrils lean strong jaw full bright eyes forehead broad between the eyes and moderately dished bridge of nose straight ears medium size and alertly carried SHOULDER BLADES set smoothly against chest wall and withers forming neat junction with the body BACK strong and appearing straight with vertebrae well defined LOIN broad strong and nearly level RUMP long wide top-line level from loin to and including tail head HIPS wide approximately level laterally with back free from excess tissue THURLS wide apart PIN BONES wide apart and slightly lower than hips well defined TAIL HEAD slightly above and neatly set between pin bones TAIL long and tapering with nicely balanced switch	20 10	30				
2. DAIRY CHARACTER *Animation angularity general openness and freedom from excess tissue* NECK masculine and long with moderate crest blending smoothly into shoulders. Clean-cut throat brisket and dewlap. WITHERS well defined and wedge-shaped with the dorsal processes of the vertebrae rising slightly above the shoulder blades RIBS well arched wide apart, rib bone flat wide and long FLANKS arched and refined THIGHS when viewed from the side flat when viewed from the rear wide apart. Well cut up between the thighs SKIN of medium thickness loose and pliable. Hair fine TESTICLES both normal. Scrotum normal RUDIMENTARY TEATS wide apart squarely placed and in front of scrotum MAMMARY VEINS large long and well defined	35	35				
3. BODY CAPACITY *Relatively large in proportion to size of animal and deep at the flank providing ample digestive capacity strength and vigor* BARREL deep strongly supported ribs wide apart and well sprung HEART GIRTH large, resulting from long well sprung fore ribs, wide chest floor between front legs and fullness at the point of elbow	10 10	20				
4. LEGS AND FEET FORE LEGS medium in length straight, wide apart squarely placed. Feet short and well rounded with deep heel and level sole HIND LEGS when viewed from the side nearly perpendicular from hock to pastern. When viewed from the rear legs wide apart and nearly straight. Bone flat and flinty tendons well defined. Pasterns of medium length strong and springy. Hocks cleanly moulded Feet same as above	5 10	15				
TOTAL		**100**				

AYRSHIRE CHARACTERISTICS

COLOR — Red of any shade mahogany brown or these with white or white each color clearly defined. Distinctive red and white markings preferable black or brindle markings strongly objectionable.
SIZE — A mature bull in breeding condition should weigh about 1800 lbs.
HORNS — Inclining upward medium size at base refined medium length and tapering toward tips

GUERNSEY CHARACTERISTICS

COLOR — A shade of fawn with white markings clearly defined black or brindle markings objectionable. Skin should show golden yellow pigmentation. When other points are equal a clear or buff muzzle will be favored over a smoky or black muzzle
SIZE — A mature bull in breeding condition should weigh about 1 00 lbs.
HORNS — Inclining forward medium size and yellow at base refined medium in length and tapering toward tips

JERSEY CHARACTERISTICS

COLOR — A shade of fawn with or without white markings.
SIZE — A mature bull in breeding condition should weigh about 1500 lbs.
HORNS — Inclining forward incurving small at base refined medium length and tapering toward tips.

BROWN SWISS CHARACTERISTICS

Strong and vigorous. Size and ruggedness with quality desired. Extreme refinement undesirable.
COLOR — A shade of brown varying from a silver to a dark brown. Hair inside ears a lighter color than body. Nose and tongue black with a light colored band around nose. Color markings which bar registry are white switch white on sides top head or neck and legs above knees or hocks. White on belly or lower legs objectionable.
SIZE — A mature bull in breeding condition should weigh about 1900 lbs.
HORNS — Inclining forward and slightly up. Medium size at base medium length tapering toward black tips.

HOLSTEIN CHARACTERISTICS

COLOR — Black and white markings clearly defined. Color markings which bar registry are solid black solid white black registering leg touching black switch, black belly black and white intermixed to give color other than distinct black and white. hoof black from hoof to knee or hock
SIZE — A mature bull in breeding condition should weigh about .000 lbs
HORNS — Inclining forward incurving medium size at base, refined medium length and tapering toward tips.

Fig 22 3

BULLS ARE EVALUATED UPON CONFORMATION, BREED TYPE, SOUNDNESS, AND EYE APPEAL

There is considerable difference of opinion on whether or not dairy bull judging in our major shows has had any really beneficial effect upon tbe improvement of dairy cattle. The reasons most frequently mentioned in support of this view are: (1) That the most successful bulls in the show ring are seldom the best in service. In other words, bulls much less desirable in conformation tend to sire progeny that rate as more acceptable. (2) That the fitting and exhibiting of a bull on the show circuit usually takes him out of service for from six to eight months.

It ought to be emphasized, however, that the conformation, breed type, soundness, and especially eye appeal of bulls as well as cows currently exhibited are superior to that of those shown 30 to 40 years ago. This would tend to indicate that selection for type has improved the conformation of both bulls and cows.

Points to be emphasized in bull selection: The phenotype of a bull is correlated to the phenotype of his daughters. This point was discussed in Chapter 3. It was shown that bulls rated excellent in type transmitted about 4.5 points more to their daughter's type rating than bulls rated good transmitted to their daughters. Stated another way, excellent bulls sired daughters that rated 84.5 in classification, whereas bulls rated good sired daughters that rated 80.1 in classification. The difference in type rating of the dams in this study was only 0 8 of a point.

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It has been shown that there is a positive correlation between the type of a bull and that of his daughters. Therefore, it is desirable for the improvement of the type of tbe herd that the sires used bave good conformation. If this is done for several generations, and selection is practiced in tbe herd, there will be a measurable improvement in type.

In judging and especially in berd classification, bulls are evaluated in terms of a score card that is used very much as the cow score card is when applied to judging cows. Figure 22.3 reproduces the score card adopted by tbe Purebred Dairy Cattle Association.

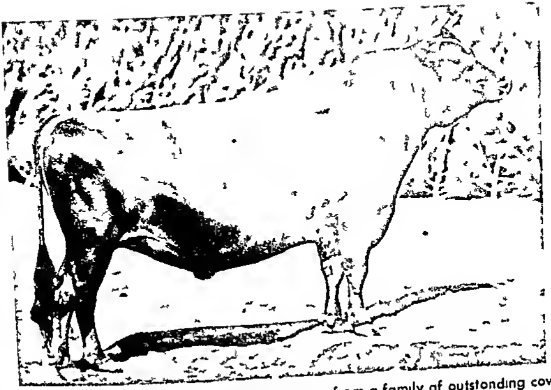


Fig 22 5 Chief s San of Etta shown here comes from a family of outstanding cows His dam Sybil Design Etta was twice Grand Champion cow of the All American Jersey Show Her daughter Sybil Design Etta Ideal was grand champion at the International Dairy Show in 1953 Sybil Design Etta was the dam of the first prize produce at the same show Chief s San of Etta was grand champion bull of the International Dairy Show in 1955, 1956, and 1957 He is definitely one of the most outstanding individuals of the Jersey breed (Courtesy, Chester Falck, Springfield, Ohio)

Fig 22 6 This Guernsey bull, Fairlawn Peerless Actor, has been selected to represent his breed because he is a splendid individual and he has sired many outstanding progeny Over 10% of his classified daughters have been rated Excellent and 19 daughters have production records above 700 lb fat (Photo courtesy, American Guernsey Cattle Club)

This score card tends to be somewhat unrealistic inasmuch as it places too much emphasis on dairy form and not enough on functional qualities. The former has been previously discussed in this chapter; the latter has a direct and important bearing on the sire's value as a breeding animal in the herd or in artificial service.

Highly desirable bulls that have been rated high in the show ring and that have been regarded highly by breeders are shown in Figures 22.4, 22.5, 22.6, 22.7, and 22.8. The legends under each picture describe in some detail the characteristics of the animal.

Bulls should possess good feet and legs. There are two basic reasons in support of the above statement. (1) Perhaps the most important reason is genetic. A bull transmits his physical characteristics to his progeny, and undesirable legs, especially hind legs, are easy to acquire and difficult to eradicate from a herd. (2) A heavy strain is placed upon the hind legs of a bull when he mounts a cow. Weak legs, especially bad sickle hocks and weak pasterns, interfere with successful mating. The service life of bulls with poor feet and legs is usually shorter than for a bull with good feet and legs. Perhaps there are three types of leg defects that should be emphasized.

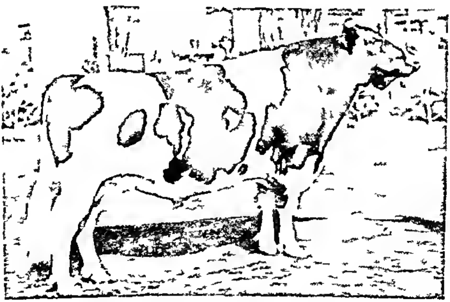


Fig. 22.4. This Holstein bull, A.B.C. Reflection Sovereign, is an outstanding individual, having been grand champion at the International Dairy Show and a sire of outstanding type. His sons and daughters have proven outstanding in the show ring and in classification. He is one of the great show and breeding bulls and his semen is in great demand in artificial service.

Avoid sickle and cow hocks and weak pasterns: An animal possessing all these leg defects (1) would have too much bend in the hock joint when viewed from the side, (2) the hocks would tend to be near together, and the feet would be much wider apart than the hocks when viewed from the rear, and (3) the pastern would appear weak and would give down a great deal when the animal is walking. These defects do not necessarily exist together. For example, the animal could have sickle hocks without being cow hocked or he could be cow hocked and not sickle hocked. He might have weak pasterns without either leg defect. An animal with any one of these defects has a leg weakness. But a combination of them accentuates the leg problem.

Reject puffy hocks, enlarged ankles: Quite often a bull may have straight legs but have coarse, puffy hock joints. This condition

Fig 22 9 The rear legs of this two-year old bull are too straight, and they are lacking in quality Even at his age (2 years) there is evidence of puffiness at the hocks, especially on the left leg By the time this bull was four years old he was very "puffy" at the hocks and limped when he walked.

Fg 22 7 Th s Ayrsh re bull Noshom ny Preferred has been selected becouse of splend d type ond excellent tronsm tt ng ob l ty He s rated Excellent double approved More than 20% of h s class fed doughters have been rated Excellent and 50% Very Good A plus proof of 1609 lb m lk and 81 lb fat on 185 records nd cate h s ob l ty to transmit product on (Photo courtesy Ayrsh re Breeder s Association.)

Fg 22 8 The bull Lee s H ll Kayak M. s an excellent specimen and outstanding sire of the Brawn 5w ss breed He was grand champ on bull at the Internat onal Da ry Show in 1953 1955 and 1956 He s red the first pr ze jun or get of s re at the International show n 1954 Twelve daughters that have been class fied average 86 25 Eleven daughte s that have been tested w th 18 records average 14 034 lb milk and 595 lb fat (Photo courtesy Brown Swiss Breeder s Associat on)

chapter 23

The show ring and judging technique

The American show ring in its various levels of competition has provided an open forum in which to evaluate and compare achievement in the type phase of dairy cattle breeding. It is one of the oldest programs for assaying the progress made in improving the type of dairy cattle. Fairs and livestock shows have been held in the United States for more than a century. Even some county fairs have celebrated their centennial anniversary.

The idea of the cattle show originated in the native homes of our present-day breeds of dairy cattle. We know that regular shows were held in Holland, England, and on the Islands of Jersey and Guernsey before dairy cattle were successfully imported to the United States. Currently there are a number of important dairy shows held in the United States each year. Perhaps three of them are sufficiently outstanding to merit special mention. They are the Eastern States Exposition, held at Springfield, Massachusetts; the Dairy Cattle Congress, Waterloo, Iowa; and the International Dairy Show now held in Chicago, Illinois. The Dairy Cattle Congress has recently been designated as the national show for four breeds of dairy cattle. The Jersey breed in 1955 and 1956 designated the International Dairy Show as its national breed show.

frequently, if pronounced and persistent, causes lameness It is generally associated with overstraight legs, poor general quality, and a lack of density of bone This condition will probably cause a bull to go out of service more quickly than sickle hocks Figure 22 9 shows legs that are too straight By the time this bull was four years of age he limped badly when walking

Avoid overstraight legs It is natural for a bull or a cow to have a certain amount of bend in the hock. Flexibility in the joints tend to keep them functioning normally and during a regular normal life span Occasionally, an animal will have overstraight legs Such legs lack flexibility in the hocks and pasterns and tends to "stock up" (swell in the hock and pastern joint) Bulls with overstraight legs seldom reach maturity without showing some joint trouble This trouble is hastened or speeded up if the animal is confined to a box stall with a concrete or masonry floor

Weak pasterns Occasionally an otherwise highly desirable cow or bull will have long and very springy pasterns In extreme cases the pasterns will be so weak that the dew claws will touch the ground with each step In extreme cases the pastern joint (some times referred to as the fetlock joint) becomes enlarged and very sensitive In such instances the animal is reluctant to walk and, if a bull, may refuse to mount a cow

Crampiness in bulls This condition is also discussed in Chapter 27 where methods of detection and discrimination by the judge in the show ring are referred to But crampiness is a problem in the herd bull and in artificial breeding It appears to be partly genetic and partially management It is highly important in predicting the future usefulness of a sire It is usually progressive and becomes worse as the animal ages It seldom responds completely to treatment But good management and treatment may prolong the serviceable life of an infected animal. Crampy bulls should not be purchased unless the consequences are carefully considered by the purchaser

The show ring enables a breeder to determine the genetic progress he has made: The major shows bring animals together from many sections of the country, the largest ones, as the International Dairy Show, even internationally. This affords a spectator an opportunity to study the best animals without being obliged to travel extensively. As a consequence a breeder can compare, directly if he exhibits or indirectly if he does not, his animals with the best the breed has to exhibit. He can then decide whether or not his best animals compare favorably in conformation with those at the show.

Shows provide an occasion for breeders to exchange ideas: In many respects this is the most important contribution of the show ring. Information is obtained when ideas are exchanged; when questions are raised and answered. Furthermore, the competition provided serves as an inspiration to breeders to attain greater perfection of type in their animals. It is the show ring more than any other agency that establishes the type goals which breeders struggle to achieve.

Exhibiting is a form of advertising: In modern merchandising, advertising is a basic ingredient of salesmanship. The sense of sight has a high value in providing a convincing argument. "To see is to believe" is a cliche, but viewing a good sample has a high value in creating a favorable impression of a breed.

The prizes offered in the various classes make it possible for a good herd to do this type of advertising at a relatively low cost. The sale of surplus animals while on the show circuit takes direct advantage of the visual advertising.

Exhibiting successfully adds to the value of the entire herd: Show herds usually represent a small percentage of the animals owned by the exhibitor. They serve, however, as a kind of show window, a well-chosen sample of the herd. The sample is associated with the herd. If it is outstanding, the herd is likewise assumed to be, and usually is, of comparable quality.

CONVENTIONAL SHOW-RING JUDGING

Most state fairs and national shows have a somewhat standardized program for listing and exhibiting animals. The base dates for the different age groups are July 1 for the senior and more mature classes and January 1 for the junior classes. The open classes

The National Dairy Show was first held in Chicago, Illinois, February 15 through 24, 1906. It was later, about 1908, that it was conceived as the final or culminating forum at which each year the best cattle could be finally assembled and compared. It has thus come to provide an occasion for the meeting of breeders from almost every part of the world.

THE OBJECTIVES OR GOALS OF DAIRY SHOWS

Basically the modern shows in the United States evaluate animals by the use of some modification of comparative judging. Animals are exhibited according to age, and usually they are placed in numerical order with the best prizes awarded to the animal with the lowest number. Thus animal no. 1 obtains first prize, no. 2 second prize, etc. Certainly state fairs and major shows have attained a degree of maturity that assures their future. There are a number of reasons why they have survived. Among them are these:

They provide an opportunity for animals to be directly compared: The various classes have been quite well standardized so that animals with the same development appear together. With animals paraded around the ring, as is the custom in our more important shows, spectators have a good view of the animals and usually follow the progress of the judging quite carefully. They are thus not only able to obtain the opinion of the judge when the ring is placed, but they can compare the animals while the judging is in progress.

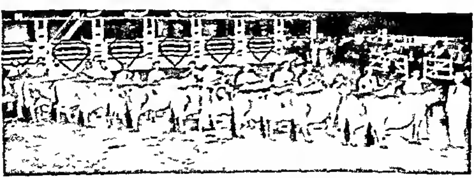


Fig 23 1 The aged Jersey cow class at the 1956 International Dairy Show, after they were placed and before the prizes were awarded Note the similarity of type and uniformity of quality

Although special group classes are frequently included in the catalog, they are not necessarily standard for the different fairs. In many shows the junior get of sire, a group class, instead of being shown as indicated, is shown after the open classes have been judged. The best-uddered class is sometimes shown before the cows in milk have been shown in their respective age classes. Breeders object to this arrangement and prefer the best-uddered class to be shown either after dairy herds have been judged or even after the senior get of sire class has been placed. The reason they object is that they do not want to bag their cows on consecutive days or show their best-uddered cows in the group classes with their udders empty. The rules usually require a milk-out in the best-uddered class so that the judge can evaluate the udders when distended with milk and also when empty.

Placing animals and giving reasons: In conventional show-ring judging, the animals are placed in sequence. The best animal is placed in the number 1 position, the second best in 2, the third best in 3, etc., until enough animals are in the line to take all of the available prizes. This procedure is followed for each ring of animals or groups of animals.

In the Junior shows and in a considerable number of the larger open shows, the judge is required to give reasons for his placings. This adds an academic value to the judging, and enables the ring-

Fig 23 2 This is the first prize dairy herd at the Dairy Cattle Congress, 1953. A dairy herd is expected to be very dairy like and milky-looking The individuals should also be uniformally good This dairy herd is a good representation of the breed.

are more likely to be standard between fairs than the group classes which may vary considerably from fair to fair.

A standard lot classification for a major show: Most state fairs would operate under essentially this classification for both males and females.

Open Individual Classes—Male

1. Bull calf under 1 year and over 4 months (senior calf)
2. Bull 1 year and under 18 months (junior yearling).
3. Bull 18 months and under 2 years (senior yearling).
4. Bull 2 years and under 3 years (2-year-old)
5. Bull 3 years or over (aged bull)
6. Senior champion bull (2-year-old and aged bull eligible).
7. Junior champion bull (senior calf, junior yearling, and senior yearling eligible)
8. Grand champion bull (senior and junior champions eligible).

Open Individual Classes—Female

9. Heifer under 1 year and over 4 months (senior heifer calf)
10. Heifer 1 year and under 18 months, not in milk (junior yearling heifer)
11. Heifer 18 months and under 2 years, not in milk (senior yearling heifer)
12. Junior champion female (senior heifer calf, junior and senior yearling heifers qualified)
13. Junior get of sire (4 animals under 2 years of age, none in milk, nor more than 2 bulls, all bred by exhibitor)
14. Heifer 2 years and under 3 years (2-year-old)
15. Cow 3 years and under 4 years (3 year-old)
16. Cow 4 years and under 5 years (4-year-old)
17. Cow 5 years or over (aged cow). In some shows a dry cow class is added.
18. Senior champion female (2-, 3-, and 4-year olds and aged cow qualified)
19. Grand champion female (senior champion and junior champion qualified).

Group Classes

20. Dairy herd (4 cows that have calved, all owned by exhibitor).
21. Best-uddered cow (judged on udder alone, all milking classes qualified)
22. Get of sire (group to consist of 4 animals, either sex, the get of one sire At least one to be 2 years old or older. Not more than 2 can be bulls).
23. Produce of dam (group to consist of 2 animals any age, either sex, the produce of one cow)

    Other groups such as the following may also be listed.

    Three best females bred and owned by exhibitor.

    Three best-uddered cows bred and owned by exhibitor (limited use)

    Regional or district herd of state shows (consisting of 1 bull any age, 2 females 2 years or older, 2 females under 2 years, 1 female any age)

    State herds at regional national, or international shows. Herd to consist of 1 bull any age, 2 females 2 years old or over, 3 females under 2 years, 2 other females any age

animals higher in the line, this provides a good opportunity. The judge should make his shift in the line by leading animals forward around an animal that he wishes to place farther back in the line rather than by directing the leader of that animal to take it back into the designated position. This is a courtesy the judge owes to an exhibitor.

Finally, as a concluding inspection of the ring and for the benefit of the spectators, the judge should parade the ring slowly around the arena. At this time he will make his final decision on the ring and, if necessary, shift animals to other positions in the line before the animals are ultimately lined up to receive their awards.

Group classes are usually placed by starting a line in a convenient place near the exit with the first group, and then lining up the second group directly behind them, following with the third, etc., until all groups are in line.

JUDGING THE GROUP CLASSES

Each group class in a show has been introduced to emphasize some special objective. For example, the dairy herd (4 milking animals) was established to stress the importance of the dairy qualities in a herd, the get of sire to draw attention to the importance of the transmitting ability of a sire, etc. But in all classes the group is exhibited as a unit, and some importance is attached to numbers.

The placing of groups presents the judge with some rather special problems, and these are not dealt with in precisely the same manner in different sections of the country. In some parts it is customary to place the group according to the ribbons won. Stated another way, an exhibitor with two firsts, a third, and a fifth expects to place above a competitor who has three seconds and a sixth.

Such a procedure tends to defeat the purpose of a group class. The groups are, to be sure, considered on the merit of the individual animals, but, beyond that, they are expected to have uniformity of type, balance, and group appeal. In other words, the animals within a group, in addition to being good, should match up well with each other. A group with one or two outstanding animals and the others average or below does not possess group appeal.

Other factors remaining the same, development and maturity are favored in placing groups. Wide differences within a group, be it in quality of animals or in age do not make for group appeal.

side to follow the reasoning of the judge as he evaluates the relative importance of the defects and strengths of the animals. If reasons are well given and lucid, they can add much to the value of the show. The judge must be careful, however, to emphasize most those reasons that can be readily seen in the animals he describes. His remarks should never be caustic or unnecessarily uncomplimentary.

The technique of placing and handling a large ring of animals: A judge can be systematic and handle a ring smoothly, thus enabling the exhibitors and ringside to readily follow the judging, or he can use a haphazard procedure that will confuse both the leaders and spectators. There are many procedures for handling a ring that have proven satisfactory to both the judge and ringside. Whatever the method may be, the procedure must: (1) move the cattle about the ring smoothly and without confusion; (2) provide the spectators at the ringside with as good a view of the cattle as possible; (3) enable the judge to observe all of the animals in motion; (4) provide the judge with an opportunity to see all the animals while they are standing at rest (this is especially important in the younger classes, as the faulty toplines show up best when the animals are standing); (5) permit the judge to view the animal from both sides as well as from front and rear; (6) enable the showmen to move into their designated positions without confusion and in a minimum of time.

Unless the number of animals exhibited is very large or the size of the ring inadequate, a judge should place a ring in from 15 to 25 minutes. During that time he should have quickly and carefully observed both the good points and weaknesses of every animal in the ring. Each ring presents a slightly different problem to the judge, but usually he should have in mind the animals that he expects to put in the first six or seven places before he moves any. After those are in position he can then designate each animal which then moves into position at the end of the line.

It is easiest to form the line of animals that are being placed with the first animal on the right. Since all animals are taught to lead from the left side and animals move around the arena in a clockwise direction, the leaders are not obstructing the view of the judge while he is observing their animals. Furthermore, the leaders can "peal off" any number of animals from the right end of the line and lead them in a small circle for the judge to study them as they stand one behind the other, side view. If he wishes to shift any

without regard to their individual merit. If, however, champions and reserve champions are to be placed, then the judge will designate his first and second choices from among the animals in this group. In some shows, judged by the Danish system, all the animals in the blue ribbon group are placed 1, 2, 3, etc. Having placed the blue ribbon group, the judge then selects from the next best animals those that he considers good enough for the red ribbon group. Every animal in this group obtains an equal rating. The remaining animals are placed in the white ribbon group. Thus an animal exhibited under the Danish system may receive any one of three possible placings, whereas if it were exhibited in a conventional show it might occupy any position in the ring from first to last.

One of the advantages of the Danish system of judging is the ease with which a judge can uphold quality in animals. For example, he can decide that none of the animals shown are of sufficient merit to justify a blue ribbon. He can then omit the blue ribbon class entirely and begin with the red ribbon group. Or, conversely, in a ring of outstanding animals, he might not include any animals in the white ribbon group but put them all in the blue and red ribbon groups.

Merits of the Conventional and Danish Systems of Judging

The Danish system is probably the more desirable for junior shows. Such shows usually include a large number of entries. These entries have few outstanding animals among them and few also that are below standard. Consequently, the animals are very much alike and usually not well shown, and decisions under these conditions, in the conventional system, would be made on very minor differences. Such placings are difficult to explain and even harder to defend.

At the summit shows, however, especially when cash prizes are awarded, the conventional system is to be favored. The exhibitors are more experienced, are better able than juniors to distinguish between minor differences, and the winnings of their better animals are more meaningful when used for advertising purposes.

County Fairs

Dairy cattle breeders through the medium of county fairs have an opportunity to exhibit their cattle in competition with other breeders whose herds are of comparable quality. County fair dates

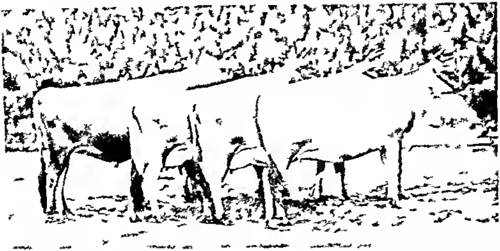


Fig 23 3 A get of s re should show excellent type un form ty and equal strength in the d fferent an mals Th s get is not as mature as some but it is strong in the ages represented

THE DANISH SYSTEM FOR PLACING ANIMALS

The Danish system of judging is based upon the concept that the making of fine distinctions between animals is not of great im portance, that such choices are difficult to make and not likely to be agreed upon and thus in many situations, it is preferable to group animals of similar competence together There are valid reasons for this view For example when the number exhibited in a single class is very large, and many of the animals are essentially equal in conformation and dairy qualities, it is much simpler and about as accurate to place them in three or four groups Further more this system is especially well adapted to Junior shows such as 4 H, vocational agriculture, and to district or parish breed shows Such shows are usually held for their educational value, and group differences that are quite pronounced are much easier to observe and explain than are the minor differences between in dividual animals

Animals are placed in groups There are minor variations in the judging procedure followed under the Danish system But, more often than not the animals are placed in one of three groups These groups are usually designated as the blue, red and white rib bon groups The judge decides the number of animals he deems worthy to be placed in the first or blue ribbon group Let us as sume that there are five These are then stood side by side, usually

The Successful Judge

The popular and proficient judge is a master in conveying to the ringside the desirable qualities and weaknesses upon which he bases his decisions. The following suggestions come from experiences of the most successful judges.

Before the Show Starts

The judge should always arrange to arrive at the show before the scheduled starting time as he will want to confer with the cattle superintendent or clerk to determine the maximum number of animals to be placed in the various classes, check equipment for giving oral reasons and determine where each class should be lined up so the animals will be best displayed to the ringside. It is wise for the judge to know the approximate number of animals to be shown that day. He should request the clerk to notify him when all the entries for each class are in the ring. The clerk can be very helpful. The breed fieldman is usually present and ready to assist the judge and/or the clerk in every way possible.

Some fairs have an unwritten rule that the judge is not to be in the show barns before judging. This prevents criticism and it is safe for the judge to make a practice of never visiting the barns prior to or during the judging or to lunch with an exhibitor.

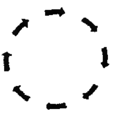
Conduct

The judge should require a high standard of conduct on the part of the leaders while in the ring. Discipline may be required, such as instructing a leader to hold his animal in line, but helpful suggestions are the more common need.

Timing

Both exhibitors and ringside appreciate prompt and thorough decisions. The "slow" judge is not always the best. Slow judging brings about a drag in the whole show including the promptness with which the boys bring the classes out. Twenty minutes is usually a sufficient judging time for the average class in the larger shows. The "slow" judge seldom receives a repeat invitation to judge.

1 Judgment and examination



(a) When entries are all in the ring, by motion of his hand the judge directs them to move clockwise in a large circle. This generally gives the judge and the ringside an unobstructed view. The clerk can help, if the leaders do not readily grasp directions. By thoroughly studying the class from a distance at this time, placings can be well in mind before making close examination.

are arranged so that it is possible for an exhibitor to complete a fair circuit with competition for each week of the show season Premiums are such that a better-than average herd can make expenses and provide some additional for the owner's wages Sales while on the circuit and the value of the advertising gained are additional compensations

Some county fair managements stress the educational advantages of the show, provide a tent and bleacher seats, and require the judge to give reasons on each class Some fair boards have even gone to the expense of providing permanent judging arenas with a seating capacity to accommodate 300 to 500 spectators Such fairs are usually well attended and exert considerable influence upon the dairy interest of the area.

Fitting and Quality of Herd Important When Exhibiting

If a breeder expects to receive favorable advertising with his show herd, the herd must look the part The exhibitor must start the show circuit with his herd in good condition and expect them to improve as the season advances It is difficult to keep heavy-milking cows in condition while they are being moved from show to show Therefore, their breeding program should be planned so that they will calve at the proper time to be in their best "bloom" for the most important shows Fitting and showing will be discussed in Chapter 26

Procedures Recommended in Judging a Major Dairy Show*

The Show Ring

Arenas are usually closely scheduled on time, however, by having the show well organized and with a judge who places the cattle in a reasonable period of time a schedule can be met Nothing is more disconcerting to the ring side and exhibitors than a shifting of the place where a particular breed is being shown. Groups ' are one of the most valuable parts of the show and deserve a ' break," i.e , ample room and time for showing.

The Man at the Halter

The man at the halter and the judge make the show on show day They are a team that accomplishes the objectives of showing competition. There is a definite display of sportsmanship among the showmen and with the help of the judge, friction in the ring need seldom occur

*Approved by The Purebred Dairy Cattle Association and American Dairy Science Association. Published by Purebred Dairy Cattle Association.

5. Inspect all animals from front and rear after they have been lined up Then notify the clerk that the class is finished

6 The judge should give oral reasons Reasons should be positive and convincing, explaining to the showmen and ringside how one animal excels the next without criticizing the entries Shows are requested to have loud-speaker facilities available

Have all prize winners led in order placed to a spot at center of the ringside to receive the ribbons—then have them parade before spectators in the order placed when leaving the ring (the clerk or field representative makes the awards and can assist in dismissing animals not placed)

If special rosettes are offered by a breed association they should be awarded in the ring at the same time as the other ribbons When the field representative is not present to award them, he usually has arranged to have someone present them

7. Loud-speaker facilities are used for announcing the placings This is an important time in each class Accuracy must come first and interesting facts beyond the usual merits of an entry can be used to further the educational part of the show The field representative or clerk usually announces the winners

8. Champions

Junior and senior championships are shown separately with the animals led in order of age, oldest first The first prize winners in classes under two years compete for junior champion and the first prize winners in classes two years and over compete for senior champion

Two animals, the senior and junior champions, compete for grand champion

Reserve champions

When selecting reserve junior and reserve senior champions, the second prize winner in each individual class stands by in the ring When the junior champion has been selected that animal is led from the group and awaits to compete for grand champion The second prize animal in the class from which the junior champion was selected competes with the remaining first prize winners under two years for reserve junior champion The other second prize animals under two years actually don't compete but were in the ring and ready in case the junior champion be from their class For example, the first prize junior yearling heifer is declared junior champion The second prize junior yearling then competes with the first prize senior yearling and first prize heifer calf for reserve junior champion This same procedure applies to reserve senior champion

The reserve grand champion is selected from two animals—the junior or senior champion not designated grand champion, and the animal that was reserve junior or senior champion to the one declared grand champion. For instance, if the senior champion wins grand champion, the reserve senior champion competes with the junior champion for reserve grand champion

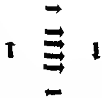
(*b*) It is essential to see both sides of the animal as well as front and rear view The judge can do this by observing from both the inside and the outside of the circle In fact, observers appreciate some act on the part of the judge indicating that he has observed both sides, rear and front

(*c*) Examine each entry for defects such as parrot jaw, crampiness, bucked knees, crooked or twisted legs, blind or shy quarters, abnormal testicles, wry faces and tails, etc It is the judge's duty to ascertain temporary lameness If this exists he may want to move such an entry for only a minimum of time and then bring the animal into place when the others are lined up The evaluation of defects established by The Purebred Dairy Cattle Association and approved by The American Dairy Science Association appears on pages 153–154

(*d*) The judge may desire to have the entries stand quietly in a circle and then occasionally move them. In milking classes this allows more room and time for thorough handling and examination of udders and teats It permits more detailed observation for defects and is used by some judges for all classes

(*e*) When there are classes with a large number of entries showing in a limited space, it is helpful to direct the best animals into the center of the circle without placing them, making sure to have a larger number than the number of ribbons or money Then reinspect all remaining entries by moving them in a large circle When satisfied this group is not of the quality needed in this class competition the clerk should be asked to dismiss them This class can then be handled in the regular manner

2 By motion of his hand the judge directs entries into the center of the circle so they line up side by side in the order of placing Have respective placings well in mind before doing this Directing them in without hesitation instills confidence in the judge by both the exhibitors and ringside



3. Stand first place animal in the same ring location in every class It is best to arrange to have their front feet on higher ground with the side, quarter side, or rump, to the ringside

4 Generally, your first opinion in judging an animal is the best unless, of course, some defect is later discovered. After placing the animals and lining them up side by side, it is good practice to have close placings led out of the line-up so they may be compared again before making a final decision Also, the ringside can better understand the problems. Make every effort to avoid changing placings after the entries have been lined up However, the judge occasionally finds this necessary

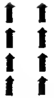
chapter **24**

Herd classification for type

The first classification for type program in the United States owes much of its success to the National Holstein-Friesian Association. It came about through a concept concerning selective registry. It seems that W. S. Moscrip, a prominent Holstein breeder, and Frederick L. Houghton, secretary of the association, conceived the idea while visiting in Holland. Upon their return they presented their views to the board of directors of the Holstein-Friesian Association, and in December 1925 a committee was appointed to study the matter and report back to the board. The committee reported in June 1926 before the annual convention of the association. A larger committee was then appointed and held its first open meeting in Chicago in December of the same year. Later three similar meetings were held in Portland, Oregon; Syracuse, New York; and Milwaukee, Wisconsin. In June 1928 the committee made its final report to the annual convention of the association. The recommendations of the committee were as follows:

> Your committee recommends that the Board of Directors be authorized to institute a plan for the recognition of proven sires, based primarily upon type and the proven production of their offspring, and to that end to appoint advisors in various portions of the country who will, upon application of the

9 Groups



Uniformity and maturity carry considerable weight in groups. In close placings it is desirable to have the animals lined up head and tail, for better detailed comparison Also, have district and state herds lined up head and tail.

When finally placed each group should be lined up abreast, one group behind the other When placing the groups, individual class placings should be kept in mind rather than secured from clerk.

The Impact of the Show Ring on the Type of Dairy Cattle

The net achievement in purebred dairy cattle improvement in the last half century is the product of many facets of conscientious effort During that time there has been manifest general improvement in the type and conformation of all breeds of dairy cattle Undoubtedly much of this has been due to visual education Throughout the years the show ring has consistently provided the principal opportunity for people to see and study large numbers of the best animals assembled from many parts of the country

The spirit of competition has constantly inspired breeders to produce better animals, and people with considerable means to acquire and exhibit them at our leading shows To breed, own, or exhibit a first prize winner, or especially a champion, is a goal that many breeders have struggled for almost a lifetime to attain

Breeders are motivated to improve the type of cattle by many different agencies, but the show ring and herd classification have probably been the most fruitful and the most productive of any

TABLE 24.1. Animals Classified for Type Each Year by Breeds and Per Cent Classified of Total Yearly Registrations

	Holstein		Jersey		Ayrshire		Brown Swiss		Guernsey	
Year	Number Classified	Per cent	Number Classified	Per cent	Number Classified	Per cent	Number Classified	Per cent	Number Classified	Per cent
1929	1,957	1.6								
1930	1,046	1.0								
1931	377	0.4								
1932	58	0.1	674	1.8						
1933	106	0.1	209	0.5						
1934	66	0.1	367	1.0						
1935	226	0.3	881	1.9						
1936	676	0.9	1,095	2.6						
1937	719	0.9	1,781	4.0						
1938	524	0.6	1,736	3.8						
1939	730	0.9	1,885	3.9						
1940	1,430	1.0	3,396	6.8						
1941	2,671	2.6	4,566	6.0						
1942	9,004	8.4	7,310	12.9	2259	12.8				
1943	7,477	6.7	11,074	20.0	2100	10.5	2052	12.6		
1944	10,753	9.5	12,399	22.2	1826	8.8	1723	9.9		
1945	8,466	7.5	10,500	21.5	2388	11.1	2267	12.1		
1946	14,306	8.5	14,501	25.8	3529	15.9	1103	5.3		
1947	18,835	12.3	19,474	24.0	4177	13.9	1852	8.2	9127	10.0
1948	12,632	7.5	14,148	21.2	2919	11.2	1333	5.9	7386	7.6
1949	15,158	8.5	15,273	22.7	3928	14.9	1758	8.3	7293	8.1
1950	16,275	8.8	16,683	23.8	1574	6.5	1350	5.9	6025	6.4
1951	21,249	11.1	15,487	22.0	4306	16.9	1440	6.2	7868	8.4
1952	16,963	8.9	17,388	21.6	3662	15.8	2753	11.8	8588	7.5
1953	20,429	10.8	13,837	19.5	1603	6.6	1743	8.0	9283	10.4
1954	23,024	11.7	15,154	25.2	3226	14.0	1292	5.7	7533	9.3

tions, with breeders viewing the entire classification. These programs did two things. They enabled the breeders, often as many as fifty, to study just how individual animals were rated for type. The observers thus had an opportunity to see an impartial judge rate animals tbat he had never seen before, and explain to them just why the particular rating was given to an animal. They could then go home and compare their own animals with those classified. Furthermore, a second value gained at these type-classification demonstrations was that there was much discussion of type, especially at the lunch hour, and breeders became more interested in its meaning to them in their herd operations.

As a result the average breeder became a better judge. He could

breeder, visit his farm, inspect and classify the sires and their offspring, and that this service be extended to include the classification of sires with daughters in the yearling and two-year old form, not yet in production, said advisors to be employed on a per diem and expenses basis, the cost to be borne by those receiving the service

Your committee further recommends that, if the breeder so desires, the advisors will classify entire herds over milking age, upon agreement of the owner not to offer for registry males from dams classifying "Poor" or "Fair"

At its meeting December 19, 1928, the board of directors of the National Holstein-Friesian Association acted favorably upon the committee's report On January 1, 1929, the program was made effective, and type classification came into being

At its annual meeting in June 1932, the American Jersey Cattle Club initiated a similar classification for type program Subsequently, all of the other major dairy cattle breed associations have installed herd classification for type programs as a part of their service to breeders the Ayrshire breed in 1942, the Brown Swiss and Milking Shorthorn in 1943, and the Guernsey in 1947

Table 24 1 shows just how this program has been received by breeders It would appear that Jersey breeders have responded the most favorably and are now classifying upward of 25 per cent of the eligible animals This table might also be interpreted to indicate the emphasis placed by breeders of the different breeds upon the importance of type in their breeding programs.

THE BASIC PURPOSES AND GOAL OF TYPE CLASSIFICATION

The first step taken by breed associations looking forward to the improvement of the type of their cattle was the establishment of an official score card The second was the development of true type pictures which were later followed by true type models These were beneficial but not adequate for bringing about the awareness of type and its place in breed improvement that the breed organizations were striving to accomplish To achieve this, herd classification programs for type were put into operation in the hope that several goals or targets would be attained These were (1) to make breeders more type conscious, (2) to improve breed type, (3) to act as a culling for type programs, and (4) to aid small breeders who owned superior animals

It makes breeders more type-conscious. It was mentioned in Chapter 3 that the early classifications were conducted as demonstra-

How Herd Classification Is Conducted and Administered

Basically, herd classification in all the breeds of dairy cattle is conducted on a common foundation. Originally therc were five categories into which animals were classified. A small group of the very best were rated excellent (E), a much larger group but still a small percentage of all classified were called very good (V.G.). A very large group were considered average and were called good (G). All animals rated in the above three groups whether male or female were considered desirable animals, and no penalty of any nature, except the group ratings, was assigned. In the next category, fair, it was concluded that there should be some penalty. In some breeds this required the return of the registration certificate to the breed association, and across its face was stamped these words: "No males may be registered from this animal." This was the penalty. It was considered that a bull had an opportunity to transmit his characteristics much more extensively in a breed than a female, and fewer bulls were required to perpetuate cattle, and so the first selection penalty was applied to bulls. The lowest group considered were called poor. Animals so undesirable as to be put in this group were not wanted in the breed, whether male or female, and the registration certificates were surrendered for cancelation. Thus animals classified poor could not further contribute to the perpetuation of registered cattle.

Herd Classification Optional

At the time it was introduced, classification appeared to be a drastic program, and it was accordingly put upon an optional basis. A breeder could participate or not just as he chose. It proved to be a popular program and many breeders availed themselves of this service.

It was not long after the program was put into operation that it became clear that a very high percentage (apparently too high) of the animals were rated good. What was even worse, there appeared to be a very wide difference between the best of the good animals and the poorest of them. It was then decided to divide this class into good plus (G.P.) and good. Therefore, almost from the beginning classification programs have rated animals in the following six different categories: E., V.G., G.P., G., F., and P. The American Guernsey Cattle Club uses a slightly different nomenclature, for they rate good plus animals, desirable, and good animals, acceptable.

recognize a good animal when he saw it, and most of all he began to understand the significance of strengths and weaknesses in animals He began to cull his herd more closely for type because he had learned that fair and poor animals neither contributed to the appearance of his herd nor improved his breeding program

Tends to improve breed type All the studies we have made have indicated that type and yield are both heritable If we had equally accurate measurements of both, the percentage of heritability would be essentially the same Classification for type has demonstrated its value as a measure of type Consequently, it provides the most valid procedure yet devised for executing a selection program for type improvement In fact, the penalties applied to poor and fair animals in themselves exert some selection pressure for type betterment

It acts as a culling for type program In those breeds in which the registration certificate is surrendered if an animal is classified poor, type classification exerts more influence on breed improvement than the classification reports indicate The reason is obvious Classifiers do not frequently encounter a poor animal in present-day classification They do not because the breeder has sold the animal before the classifier arrives on the farm Most animals of this quality are culled from the herd for beef As a result, the poor class has been discontinued by most breed associations

Prohibiting the registration of male calves from cows classified fair no longer has much influence on breed improvement Since artificial insemination has become prevalent, a relatively small number of service bulls are required It is seldom that a bull even from a good cow is retained for or sold for breeding purposes The impact of the classification for type program upon the thinking and practices of breeders has had a more favorable influence on culling for type improvement than the physical requirements of the program itself

It assists the small breeder with superior animals The classification program and especially the regional plan for its present conduct have proven a boon to the breeder with a limited herd It provides him with the same service in evaluating type that the owner of a larger herd has and at a cost that he can afford to pay If his herd ranks high in type, he has the evidence of it, and the resulting publicity will aid him in locating a market for his better animals Furthermore, if he has an outstanding animal, it will be recognized, and he can thus share fully in the profits if he cares to sell it

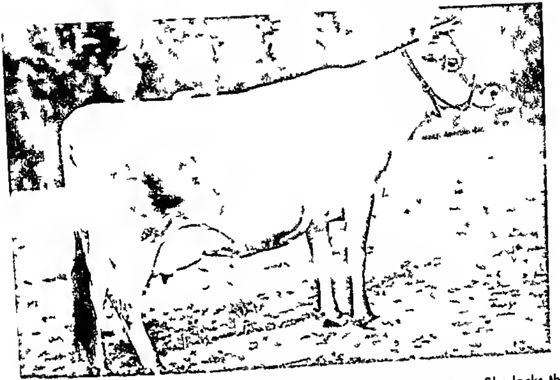


Fig 24 2 Shows a very good Jersey cow Her faults are not serious She lacks the smoothness and perfection of form required in an excellent animal but she is a highly desirable cow without serious weakness She does not possess the breed character of Fig 24 1 nor does she have the capacity or smoothness of udder She does not stand as straight on her hind legs

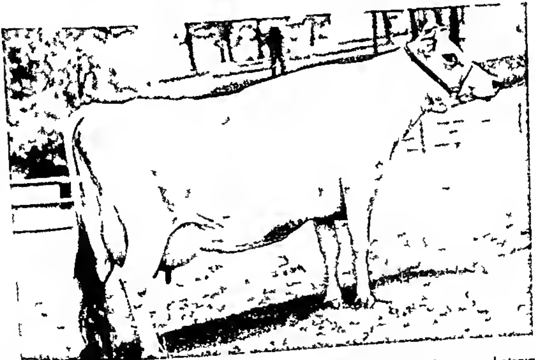


Fig 24 3 Is rated as a good plus cow She lacks the scale smoothness and straightness of topline shown by the very good cow Her udder is not as desirable in form or as good in texture Her rear udder hangs rather low She is the kind of cow that occurs in large numbers but is desirable in almost any herd

The classification ratings become more realistic when typical animals are studied In Figures 24 1 through 24 5 Jersey cows are shown to illustrate each one of the five classification categories The legend under each photograph gives the rating and the major reasons why the animal was given its rating

For many years the program simply made one rating upon the entire animal Later classifiers and breeders both agreed that the program would be more realistic and meaningful if different parts of an animal were rated separately It was found for instance, that an animal would rate very well in most respects but be very poor in one It might, for example be excellent in dairy tendency and very good in body and udder, but fair or poor in legs Obviously, then the real need for genetic improvement was in legs and feet To be able to identify these areas of weakness or strengths as it might be, the breakdown program of herd classification was inaugurated

The Breakdown or Parts Classification

All breed associations employ the same basic principles in break down classification but modified slightly to meet their own con

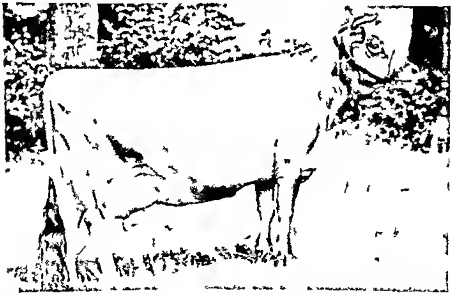


Fig 24 1 Portrays the excellent cow Wonderful Snowdrop She represents a very high standa d of excellent and rates among the best cows of the b eed She possesses the type smoothness capacity and qual ty requ red n th s class Her udder has the s ze symmetry shape and balance expected on an excellent cow Her teats are desirable in size She stands squarely on stra ght legs She is a splend d specimen of an excellent Jersey cow

cepts. Figure 24.6 shows how each of the five major dairy cattle breed associations have identified the parts of an animal that they wish to evaluate separately. It might also be added that these forms are subject to change at the discretion of the board of directors of the several breed associations.

Selection of Classifiers and Standardizing Ratings

The central office of the various breed associations have charge of their classification programs. Individual classifiers are chosen and approved by a breed association. They may and often do classify concurrently for more than one breed association. Classifiers are recognized judges, at least of the breeds they classify, and in addition are usually considered good cattle men. They are, when actually classifying, employed by the breed association and under their jurisdiction. Some are employed full time, but the majority accept only certain assignments.

There are two views regarding classification. Some breed associations employ full-time classifiers and thus strive to standardize ratings by having as few different classifiers as possible. Others take the view that less travel is involved, and that there is less likelihood of one person exerting too great an influence, if classifiers are located in several parts of the country, and a considerable number participate in the program. There are valid arguments for both concepts. Most breeders, however, prefer to have the views of more than one classifier in rating their animals when all are competent judges.

From the associations' point of view, it is much simpler and cheaper to have a conference of classifiers with a view to standardizing concept if only a few persons are involved.

VARIATIONS IN CLASSIFICATION RATINGS ON THE SAME ANIMAL

Many studies[1] have been made to determine why classification ratings made at different times on the same animal are frequently

[1] R. H. Benson and G. Hyatt Jr., Some Causes of Variation in Type Ratings of Ayrshire Cows, *J. Dairy Sci.*, 34: 502, 1951.

L. E. Johnson and J. L. Lush, Repeatability of Type Ratings in Dairy Cattle, *J. Dairy Sci.*, 25: 45, 1942.

R. W. Touchberry and K. A. Tabler, The Changes in Type Ratings of Holstein and Guernsey Cows When Rated by the Same Three Judges at Two Consecutive Times, *J. Animal Sci.*, 10: 1029, 1951.

Lon D. McGilliard and J. L. Lush, Changes in Type Classifications of Dairy Cattle, *J. Dairy Sci.*, 39: 1015, 1956.

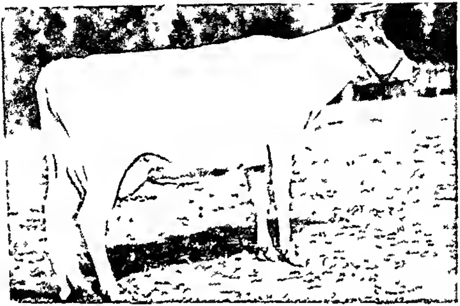


Fig 24 4 This cow falls in the classification rating of good She definitely lacks the capacity of the good plus cow She does possess quality, but she is too upstanding and frail to rate any higher She is an acceptable cow to breed from and *probably would pay her way in production* She is the kind of cow most breeders would be willing to sell

Fig 24 5 Represents the fair classification rating This is a penalty class Bulls cannot be recorded from fair cows There are many faults in this cow Her type is poor Her conformation in topline and rump is undesirable Her udder is not shapely or productive-looking Her teats are small This is the kind of cow breeders like to cull from their herds She *is not desirable* Since the poor class *is no longer rec*ognized, it is not portrayed

BROWN SWISS

Classification Rating	Detailed ratings based on 4 main divisions of the score card							
	General Appearance			Dairy Character	Body Capacity	Mammary System		
	Rating	Sub Ratings		Rating	Rating	Rating	Sub Ratings	
		Legs Ft.	Rump				Fore U	Rear U

GUERNSEY

General Appearance													
Rating	Breed Character	Shoulders	Feet and Legs		Rump	Dairy Character	Body Capacity	Mammary System				Over All Rating
			Fore	Hind				Rating	Fore Udder	Rear Udder	Teats	

Fig 24 6 Forms used by various dairy cattle breed associations in herd classification

HOLSTEIN-FRIESIAN

Final Classification	General Appearance	Dairy Character	Body Capacity	Mammary System	Fore Udder	Rear Udder	Legs and Feet	Rump

JERSEY

Tattoo	Date of Birth	Sex	Weight (Tarsal)	Classification Rating	General Appearance				Dairy Char acter	Body Capacity			Mammary System				Remarks
					Rating	Sub Ratings			Rating	Rating	Sub Ratings		Rating	Sub Ratings			
					[illegible]	Breed Char acter	Rump and Tail Setting	Legs and Feet	[illegible]		Chest	Barrel		Udder Shape and Attachment: Fore	Udder Shape and Attachment: Rear	Teats	

AYRSHIRE

Date of Birth	Date of Last Calving	Heart Girth	Est. Wgt.	Head and Neck	Shoulders and Chest	Middle and Loin	Rump and Thighs	Feet and Legs	Udder and Teats: Shape and Size	Udder and Teats: Attachment	Teats Shape and Quality	General Quality	[illegible]	[illegible]	[illegible]	Age	Rating

against the udder defect. It was definitely pointed out in Chapter 11 that a sound, well-attached udder does not give way because of heavy production. Abuse or accident can be a factor in causing good udders to fail, but production alone almost never.

When animals are most often underrated: Just as animals at times are overrated, if gaged by their average appearance, they are likewise sometimes underrated. The following situations most often account for such unfavorable type evaluations:

1. When the animal is in an advanced stage of lactation.
2. If extremely thin in flesh.
3. When hair is long and coat is rough and/or patchy.
4. When the animal, especially a young cow, has a small, shapely udder and is lacking in depth of body.

Variance between classifiers in making type ratings: Classifiers have been chosen for this work because they are known to possess competence as judges of dairy cattle. They all possess this quality in common; but the question is: How closely do they agree when rating the same animal? Research workers who have studied this problem, and many have, quite generally find that there is very close agreement between classifiers when rating the same animal at the same time. They agree more closely with one another's ratings then than they do with their own ratings of the same animal made at intervals of six to twelve months apart. Stated another way, classifiers agree more closely with one another when evaluating an animal at the same time than they do with themselves when rating the animal at different times. Since this is true, there is no valid reason why one or a few men should rate all of the animals within a breed.

The Impact of Herd Classification upon Type and Breeding Programs

Herd classification has tended: (1) to enhance the average breeder's concept of breed type and made him a better judge of dairy cattle; (2) through the breakdown classification, to point to the strengths and weaknesses of a breeder's herd, and to those in the progeny of the sires he has used; (3) to enable the breeder to evaluate his cattle in terms of the breed average, and to compare them with those of his neighbor; (4) to stimulate type culling, and thus improve the general type level of dairy cattle, (5) to produce a standard for rating type and a forum to adjudge its value.

not the same What factors contribute to this variance? How might these differences be reduced to a minimum? Are such variations important to the success of the classification for type program?

Stage of lactation In the regular breed association classification-for type programs, females are not classified until they have had one calf They may, however, be classified at any stage of lactation Animals classified within a few weeks after calving usually have a higher rating than animals classified during the later stages of their lactation or when dry This point has been studied by several research workers

Condition of fleshing Animals in good condition, but not fat, usually create a more favorable impression than extremely thin individuals do An animal depleted by heavy lactation while very dairy like in appearance (often overrated for that quality) gives the impression of being small and frail Such individuals if in the later stages of their lactation are usually underrated By the same token, animals in good condition just before or soon after calving are generally overrated Since the entire herd must be classified at one time, some animals will be in "bloom" and look their very best, whereas others will appear at their worst Perhaps at the next classification the animals will be reversed in stage of lactation and condition, and the original ratings would not appear to be the proper and valid classifications

When animals are most often overrated Experienced classifiers and excellent cow men will usually agree that on the average cows are most often overrated when

1 They are in high condition and in good bloom.
2 Just before calving
3 As two-year olds, especially in certain breeds
4 When cows are old and very capacious

Perhaps the old cows are the ones that are most often overrated There are some very good explanations of why this is true Old cows are forgiven for udder defects, especially if they have large production records, that younger cows would suffer for in penalties For example, in certain breeds a cow under six years of age would be classified fair by rule if her udder showed unmistakeable signs of breaking away from the body After ten years of age this same animal would escape the rule penalty, and, if she had made a good production record, only minor discrimination would be made

against the udder defect. It was definitely pointed out in Chapter 11 that a sound, well-attached udder does not give way because of heavy production. Abuse or accident can be a factor in causing good udders to fail, but production alone almost never.

When animals are most often underrated: Just as animals at times are overrated, if gaged by their average appearance, they are likewise sometimes underrated. The following situations most often account for such unfavorable type evaluations:

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All these objectives have been attained in some degree by the classification-for-type program. Of the five mentioned, perhaps the most significant gain has been in the first item. For it is apparent that breeders have become better judges of cattle since the type-classification program was introduced.

In some breeds it would appear that more cattle are rated excellent or very good and fewer cattle are rated good or fair now than during the earlier years of classification. This has tended to raise the average type rating perhaps as much as two points on the score card. No doubt there has been some type improvement. But some judges are of the opinion that the standards are being more liberally viewed by classifiers in the higher brackets now than they were during the first ten years the program was in effect. However viewed, the herd classification-for-type program has appealed to breeders, and they are making liberal use of it in their breeding and management programs.

chapter **25**

Selecting the club project calf or animal

The problem of choosing a suitable animal for a dairy project should be approached from this premise. It is more likely than not that the heifer selected will provide the foundation for a purebred herd. Usually club animals are selected as calves. At this age it is difficult to make an accurate estimate of their prospects for future development. Naturally the cost of the heifer at the time must be taken into account, but the ultimate success of the project can be rated only after the heifer becomes a cow. Therefore, club project leaders and potential club members should secure all the pertinent information they can before a project animal is purchased.

The Importance of Genetic Competence

In the choice of a foundation animal the inheritance which the animal possesses is extremely important for it is only the characteristics which she receives from her ancestors that she can transmit to her progeny.

Pedigree Estimates

Pedigrees in ordinary practice tend to overrate animals. A pedigree is usually prepared with two objectives in mind: (1) The seller

desires to provide the prospective buyer with a body of evidence that will enable him to estimate the genetic potential of the animal, and (2) he hopes also to make the animal appear as desirable as possible

Several items should be taken into account in estimating the breeding prospects of an animal A condition most likely to invalidate a pedigree is the omission of information pertaining to the low-yielding, or otherwise undesirable, sisters or relatives The result is that only the favorable portion of the available information finds its way into the pedigree, and the animal appears to be better than it is Nature never abides by any such half truths

There is no rapid or easy way to compute the influence of such biased information It does, however, make it more essential to check thoroughly the herd from which the animal comes Certainly the older sisters and near relatives should be carefully examined Perhaps an example of an actual experience will serve to illustrate how a somewhat similar situation was dealt with

A dispersal sale of purebred cattle was to be held in which a proven bull and some 25 of his nonmilking daughters were offered for sale The sale manager sent a special invitation to a prospective buyer in which he stated that the heifers were particularly choice, in fact of a quality seldom offered at a sale, and that by all means he should attend The pedigrees in the sale catalog were very attractive, and the production records made by the milking daughters of the bull were highly acceptable The potential buyer, being much interested, made a trip of several hundred miles to attend tbe sale and found that the heifers were as indicated—very attractive in type and conformation

The prospective buyer was an experienced breeder, and he examined the daughters very carefully He was not especially pleased with the udder prospects of the heifers and made a search for their older milking sisters None could be found Since he was of an observing type, he noticed several vacant stalls that gave evidence of having been recently used, so he made a search of the premises to determine if any animals were located in other adjacent buildings There were none, but he noticed something else that interested him very much. It bad rained the day before and there were fresb hoof marks in the mud The interesting point about it was that all hoof prints were leaving the barn, none returning Naturally he followed the tracks which pursued a path that lead into a wooded tract At the opposite end of this wooded area was an old empty bay shed Empty, that is, except for eight young cows which when tattoos were checked proved to be the milking

daughters of the proven bull. The records of these daughters were used in the pedigree, but the cows themselves were not included in the sale, presumably because they had been sold before the catalogs were issued. The udders of these cows were extremely undesirable. So bad, in fact, that the cows would be classed simply as commercial cattle.

Since there was no valid reason to assume that the heifers when in milk would have udders that were more desirable than their milking sisters, some of whom were full sisters, the prospective buyer returned home without even attending the sale. Thus he was enabled, simply by alert observation and some telltale hoof prints, to avoid making a mistake. It seems incredible, but it often happens at a sale that attractive heifers sell for more than their less tempting older-milking full sisters.

Estimating Breeding Worth if Records Are Available

Occasionally an animal is located that has several full sisters and about which a great deal is known. In such instances it would be desirable to compute actual production estimates. Professor Sewell Wright has developed a formula for forecasting the breeding worth of such an animal. He makes use of the yield and type records of near relatives and deals with regression in terms of the breed average. Briefly stated, the formula is

$$\mathrm{ETA} = \frac{A}{n+1} + \frac{n}{n+1} R$$

where ETA = estimated transmitting ability
n = number of relatives (dam and full sisters)
A = breed average in type or production
R = average production or type ratings of relatives

It should be noted that the value of A becomes less important in this formula as the number of relatives increases.

Applying the Breeding Estimate Formula

In Chapter 3 we showed the famous Brown Swiss cow, Jane of Vernon, and four of her six daughters, the first four of which were full sisters. Since records are available on each of the daughters and "Jane" herself, we can use the above formula to estimate "Jane's" transmitting ability. The four daughters each have two records and "Jane" likewise has two comparable records. Thus,

under M we have four daughters and "Jane' (5) with a total of ten records These 10 records average 18,543 pounds milk and 838 pounds fat

If we consider that the breed average for the group of cows from which "Jane' came is 15,250 pounds milk and 610 pounds fat, we can substitute those values for A in the formula Thus the formula for milk can be stated as follows

$$\text{ETA} = \frac{15\ 250}{6} + \frac{5}{6}18{,}543$$

$$\text{Solving the } equation = \begin{matrix} 2541\ 7 + \ 833 \times 18\ 543 \\ 2541\ 7 + 15\ 446 \end{matrix}$$

$$\text{ETA} = 17{,}988\ 0$$

Similarly the results for fat would be

$$\text{ETA} = \frac{610}{6} + \frac{5}{6}838$$

$$\text{Again solving} = \begin{matrix} 101\ 7 + \ 833 \times 838 \\ 101\ 7 + 698\ 1 \end{matrix}$$

$$\text{ETA} = 799\ 8$$

It might then be stated that, if precisely the same conditions and environment could be provided, then it is estimated that "Jane might be expected to transmit 17,988 pounds milk and 799 8 pounds fat

Later in her life Jane had two more daughters each by a differ ent sire These additional daughters had four records which aver age 18 231 pounds milk and 791 pounds fat—a difference of +243 pounds milk and −8 8 pounds fat from the expected yield Of course, the bull influence on the last two daughters is a factor in the genetic difference that has not been taken into account It should be mentioned that this example provides a closer fit to ex pectation than is usually realized in other similar cases The ex ample shows quite well how the formula is applied

CHOOSE CLUB ANIMALS OF GOOD CONFORMATION AND FREE OF SERIOUS DEFECTS

It is highly important in *selecting* an animal for 4 H or voca tional agricultural purposes that it possess desirable conformation and eye appeal. It is discouraging to a youngster to exhibit an

animal that does not have the qualities that enable it to be in contention for a favorable rating by the judge.

Too frequently overzealous relatives and friends build up the hopes of a youngster, without thinking of the consequences, by telling him that his calf looks marvelous and that it certainly will win first prize. At the show this club boy must enter the door of realism and discover that his hopes and expectations were ill founded, that his calf is far from an outstanding animal, and that it is, in fact, very ordinary looking when compared to the other entries. Club members ought to be told and their leaders should emphasize that outstanding calves are difficult to obtain and that the main objective of 4-H Club work is to develop a strong project and learn a great deal in the process.

Strong projects usually center about good, well-selected calves free of serious weaknesses. Various methods are employed to locate such animals. Among the more successful of these measures are: (1) state-breed-sponsored auction sales, (2) state-sponsored procurement committees, (3) local committees, (4) bank-sponsored and financed projects, (5) chambers of commerce and other sponsored programs, and (6) personal assistance by breeders.

State-breed-sponsored auction sales: This method has proved its value in several states. The procedure used varies considerably but generally follows this pattern. The state breed associations, frequently through their Purebred Dairy Cattle Association, agree to sponsor a state calf club sale. Working with the 4-H Club leader in the state, quotas for each breed are set up, and each state breed association assumes the responsibility for locating and approving the calves, obtaining necessary health papers, transporting the animals to the sale pavilion, and preparing them for the sale. Quite often their responsibility also includes providing the auctioneer and reading the pedigrees for their breed.

When such sales are annual events, and most of them are, it provides each year a relatively easy and quite satisfactory method for placing good calves in the hands of new club members. Such sales are of course limited to bona fide calf club members, and purchases cannot be made by other persons. In states where such state breed associations are in active operation, this method is highly recommended.

State-sponsored procurement or selection committees: A somewhat less formal, but, if properly sponsored and organized, a very satisfactory, method for obtaining club calves consists in the appointment of a highly competent committee to execute the project.

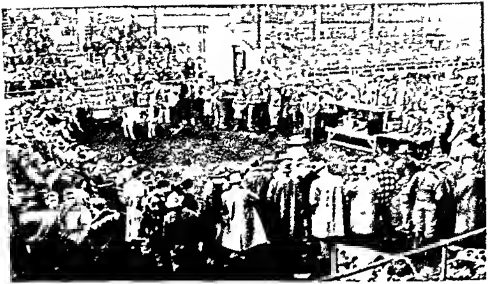

Fig. 25 1 Shows one of the annual calf club auctions in progress. This method of providing club members and potential club members with suitable project calves has proved highly satisfactory.

Such a committee may be sponsored by the breed associations and the state club leader, by the extension department of the state university, or by any other appropriate group or agency. In this case the number of calves required must be determined, a method for financing the purchase agreed upon, and other details decided before the committee sets out in quest of suitable calves.

Quite often this method requires that the committee make its selection of calves in other states where there is a high concentration of dairy animals. The calves when chosen must then be assembled at a point of concentration and transported to the place of distribution to club members. Choice of calves is usually by lot, and it is not so easy to get the most desirable calf in the hands of the best boy or girl.

Local procurement committees: Quite often 4-H Clubs operate at a local level. In such cases the sponsor or sponsors choose a committee of local people who select and distribute the calves on very much the same basis as that described above. The success of such a project depends upon the work of the local committee and club leader.

Bank- or chamber-of-commerce-sponsored projects: 4-H projects of this character are usually single ventures rather than regularly con-

ducted year-after-year projects. More often than not, the venture originates as a financing project in which the sponsor agrees to finance a certain number of club purchases in the local area. Arrangements are made to secure and distribute these animals according to plan. Generally speaking, such projects lack proper supervision and seldom attain the success of the programs mentioned previously.

There are, of course, many other methods employed in organizing and developing 4-H Club projects. The success of each usually depends upon the kind of calf obtained, and especially upon the supervision and developmental program built into the project.

DEVELOPMENTAL PHASES OF THE 4-H PROGRAM

The essence of a successful 4-H dairy project is to develop the member, make him more competent in the area or field of the project, and thus enable him to act wisely in the presence of new and unusual situations with which in later life he may be confronted. This is brought about by his enlarged experiences, the widening of his acquaintenances, by proper guidance, and through wholesome competition.

Proper guidance: It is difficult to overestimate the abiding influence of a good club leader. He touches the life of the member at the most impressionable age. Proper guidance at this period is very fruitful for two reasons. First, the project provides an exciting occasion to draw the member and leader together at frequent intervals. Second, together they explore the areas of their mutual interests, and together they extend the horizons within their common experiences. Harry A. Overstreet,[1] in a short article entitled "The Hidden World About Us," reports an experience he once had in a collector's shop. It seems that he entered a room tbat was filled with very ordinary rocks. These were, it is true, carefully laid out on shelves, but they appeared to be rocks that were no different from those to be found on any hillside. Then the room was placed in total darkness and an ultraviolet light turned on. "Instantly," he said, "the prosaic rocks leaped into a kind of glory. Brilliant colors of an indescribable beauty were there before our eyes." Less dramatically, perhaps, but equally real are the new

[1] Edward R. Murrow, *This I Believe*, pp 131–132, Simon & Schuster, New York, 1952.

vistas that unfold to a club boy or girl when under competent guidance.

Extending knowledge and learning techniques: Every time a boy works with a calf he learns something new about animals. Day by day, as he feeds and cares for his animal, he observes its reaction to his care and management. Then, when he undertakes to prepare the animal for exhibition, to clip, wash, trim feet, and train it to lead and pose, he learns the techniques of the more successful exhibitors and herdsmen. All of these are developmental. The culmination is reached when he compares his achievements with those of others who like him are broadening their experiences and their understanding of the problems of life.

How Much Is a Good Club Project Calf Worth?

This is a good question—one that requires some kind of an answer every time a new project is started. Table 25.1 provides some information concerning the selling price of calves at the Illinois Calf Club Sale, held annually usually on the last Saturday in February. The table covers the period from 1950 to 1957, inclusive. Not only are the number sold and the average for each breed given, but the

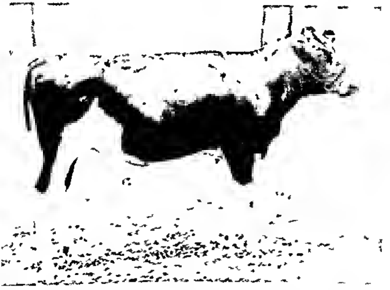

Fig 25 2 A likely heifer for a club project. Heifers of this type and quality make excellent foundations for future purebred herds

TABLE 25 1 *Prices Received—Illinois Calf Club Auction Sale* 1950 to 1957, Inclusive

Breed	1950		1951		1952				1953			
							Range				Range	
	No Sold	Price Average	No Sold	Price Average	No Sold	Price Average	High	Low	No Sold	Price Average	High	Low
Ayrshire	13	145 00	13	221 15	15	135 60	290 00	80 00	7	190 83	320 00	130 00
Brown Swiss	16	192 81	22	280 68	25	173 40	400 00	75 00	19	255 00	395 00	175 00
Guernsey	27	157 75	17	295 29	21	220 23	425 00	125 00	24	253 13	410 00	130 00
Holstein Friesian	25	194 02	20	360 75	25	353 60	515 00	190 00	27	330 00	575 00	150 00
Jersey	20	146 75	23	184 78	18	145 83	235 00	50 00	15	151 67	260 00	85 00
Average	101	168 91	95	268 78	104	195 75			91	257 58		

Breed	1954				1955				1956			
			Range				Range				Range	
	No Sold	Price Average	High	Low	No Sold	Price Average	High	Low	No Sold	Price Average	High	Low
Ayrshire	9	153 33	340 00	60 00	7	139 28	350 00	50 00	7	175 00	380 00	40 00
Brown Swiss	22	152 04	425 00	100 00	14	156 85	225 00	55 00	16	180 00	250 00	150 00
Guernsey	27	166 29	355 00	75 00	24	168 95	355 00	60 00	18	157 50	330 00	80 00
Holstein Friesian	26	299 03	510 00	200 00	26	202 30	390 00	100 00	28	225 00	425 00	115 00
Jersey	18	153 33	250 00	75 00	22	97 95	170 00	55 00	9	118 94	240 00	50 00
Average	102	189 90			93	157 20			88	176 14		

range including the lowest and highest selling animals is also included for the last six years that the sale has been held

It should be recognized that the prices given are local in point of origin, and that the quality of calves must, of necessity, vary from year to year and from breed to breed The calves were carefully selected, however, and for the most part represented a highly acceptable club project animal. The range of prices paid indicates that the needs even of those persons with a limited purse can be satisfied It is also true that the best bred and more likely looking calves were the most in demand and sold for the highest prices

As a protective measure, it might also be in good cause to mention that occasionally a club boy and his parents become highly enthusiastic and attach too much significance to the need of winning in the show ring Because of this they contract to pay more for a calf than they can afford to pay for any animal An actual example will perhaps best illustrate the perils that can follow such an experience During the last depression a club boy and his father found a very well bred and outstanding calf that was priced at $350 00 At that time, very good calves could be purchased for from $75 to $100 Although they did not have the money, they contracted to buy the calf by paying $50 in cash and giving a note for $300 About two months after the calf had reached its new home, it became sick and died There was no insurance, and the note had to be paid Fortunately, in this case the seller, although he had no legal responsibility, learning of their ill fortune gave the boy another smaller and less valuable calf

In club work as in all activities of this character, it is well to keep the calf and the purse in proper balance

chapter **26**

Selecting animals and preparing them for shows and sales

It makes little difference whether or not the choice is to be made between animals that are to be exhibited or sold, it should be done by the exercise of good judgment. If an animal is to be sold, a responsible person will value his reputation and will not, therefore, offer for sale an animal that he knows to be defective. A good breeder does not want a buyer to be disappointed with his purchase. There is only one good market for cull dairy animals, including registered individuals, and that is the butcher.

If the animals are to be exhibited, only those that have the ability to create a favorable impression upon the public should be selected. Inexperienced exhibitors often assume that it requires a large exhibit to be impressive. That is a grave mistake, because one outstanding individual will attract more favorable attention than 15 mediocre animals.

Select Animals with Quality and Capacity

In selecting animals, especially for exhibit, choose only those that are well grown and at least equal in size to the average expected for the age and breed. Extremely small animals (except

possibly in the calf classes when age is the determinant of size) are seldom desirable, on the other hand, large animals that are unsymmetrical and coarse are seldom favored

It is desirable to select animals that have graceful, well blended lines with finely chiseled features and symmetrical parts The withers and shoulders should be snugly held to the body, and the ribs should be well sprung, especially in the crops and back over the loin The bone should show plenty of substance yet be flat and dense The joints, especially at the hocks, should be clean and free of puffiness The legs should be reasonably straight, the feet should point forward and be clean at the hoof heads, and the pasterns should be strong These qualities should be accompanied with good average size, age of animal considered

For Milking Animals Choose Those with Good Sound Udders

Udders should be durable A strong forward attachment that is held tightly to the body and a high, wide rear udder attachment are always favorable qualities The median support should be strong enough to hold the quarters of the udder plumb without sagging in the center, and the teats ought to point straight downward Capacity of udder is determined somewhat by size but largely by texture The best udders are usually medium in size, stage of lactation taken into account Good texture of udder is important and is viewed as an asset to a milking animal.

Select Animals with Good Type and in Good Physical Condition

Highly regarded dairy animals have good conformation, together with ample depth and capacity Seldom do animals stand high in the show ring or sell well when offered at auction sales unless they are desirable in form and give the impression of being rugged or durable

It is a general observation that, both at sales and in the show ring, animals thin in flesh are underestimated. They are better than they appear to be Condition usually includes such items as amount of fleshing, gloss of hair, development of body, alertness or attitude of the animal, etc It may be desirable for the buyer to choose animals lacking in condition The seller usually sacrifices some income when he sells one

Conditioning usually requires liberal grain feeding—the amount to be fed being determined by the degree of fleshing desired and

the length of the feeding period available before the show or sale. Care must be taken not to get the animal in too heavy flesh. When the animal is in proper condition, and before patchiness appears over the back or around the pinbones, lighten and perhaps reduce the ration by including more bran and oats and removing corn or barley. Feed less of this ration.

Restoring a Light Quarter of an Udder to Normal

Occasionally a cow in the later stages of her lactation will milk less and perhaps dry off in one quarter but continue to milk in the other three. The involved quarter usually appears lighter and less well developed than the other quarters do, thus giving the udder an unbalanced appearance. Restoring the involved quarter to its normal capacity is a part of preparing an otherwise desirable cow for a sale or show.

Not infrequently such a quarter will, if none of the mammary tissue has been destroyed, return to its normal condition at next calving without any treatment. More often, however, treatment is helpful, and in some cases essential if the part is to be fully restored. A treatment that has proven helpful and has restored many light quarters is applied as follows:

1. Only quarters that contain some normal secreting tissue can be restored. If the quarter has been infected with mastitis, it must be successfully treated and cured before it can be restored.
2. As the udder starts to make up (proliferate) before calving massage the light quarter firmly and thoroughly for approximately 15 minutes three times daily. This massage tends to increase circulation and stimulate the tissue development.
3. Continue this treatment until the cow calves. In obstinate cases it is sometimes helpful to use a mixture of alcohol and olive oil, equal parts, as an ointment. This is applied to the quarter before massage.

Not all such quarters can be fully restored, but with valuable animals one is well rewarded for the time spent in administering this treatment.

Train Animals to Lead and Pose

Animals, both male and female, should be taught to lead when they are young. They should lead freely and willingly and at a

slow pace. An animal should come forward with a slight pull on the lead strap and back with slight pressure on the halter. A good breeder never sells or exhibits an animal that does not lead well. At least once a day the animal should be led and posed. Posing means training the animal to stand naturally and squarely on its feet and to hold its head up well and naturally without pointing the nose too far forward. Time spent in training an animal properly usually returns good dividends.

THE PREPARATION OF ANIMALS FOR SHOW OR SALE

Considerable art is required in preparing an animal to appear at its best, whether it is to be presented at a show or in a sale. Planning is essential. If the animal is a milking cow, the stage of lactation is important. Some cows look best just before calving, whereas others should be in milk four to six weeks before they appear at their best. Condition, sometimes referred to as bloom, is likewise important, and proper fitting (condition of hair and sufficient flesh) requires planning in advance.

There are many items to be taken into account in setting up a proper procedure to make an animal appear at its best at a given time. There is also a logical sequence in which these items should be incorporated in the fitting program. It often requires a year to plan and execute a fitting program. Planning the time at which the cow is to calve is an important part of the program. The major items have been included under separate titles in the following discussions.

Trimming Hoofs Often Neglected but Important

Of all of the tasks connected with fitting and showing, hoof trimming is most likely to be neglected. Yet it is one of the most important items in preparing an animal, especially for a show. It is usually necessary in older animals to have some device for restraining the animals during the hoof-trimming process. Figure 26.1 shows a restraining device designed and used extensively at the University of Illinois. It can be made of aluminum piping, if it is to be moved frequently, or of steel piping. The rack if made of aluminum is very light and easily handled. If made of steel angle iron and pipe, it is equally usable but difficult to handle. Figure 26.2 shows the dimensions and is a working drawing. The following statement describes the device. If it is made of aluminum, the cost is essentially twice as much as it is when made of steel.

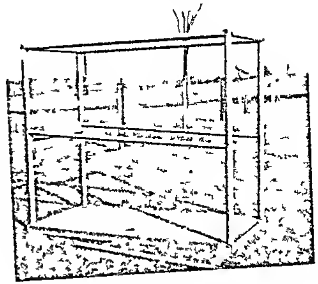

Fig 26 1 This device is made of aluminum angle iron and pipe The planks in the bottom are 3 in oak When the planks are removed, the device is very light and can be handled by one man If it were made of steel, it would be a heavy load for two men to handle

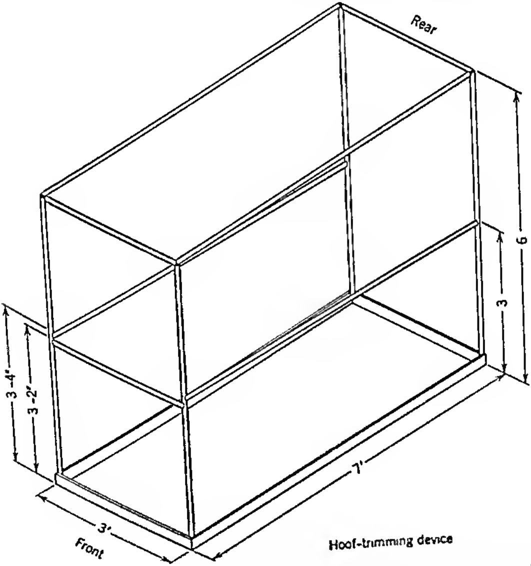

Fig 26 2 This is a drawing showing the dimensions of the restraining device used in trimming feet It can be easily made, and it has proven more satisfactory than elaborate devices that sometimes cost several hundred dollars

Description of Hoof-Trimming Device

This device to restrain animals is made of 3 inch angle iron and 2 inch ID pipe The metal may be either aluminum or steel All the joints or unions are welded

The dimensions that have proven most satisfactory are

1 Height over all—6 feet
2 Width over all—3 feet
3 Length over all—7 feet

The bar across the front is 3 feet 2 inches from the top of the bar to the bottom of the angle iron or base of the device The bars along the side are 3 feet from the ground in the rear and gradually slope upward and are 3 feet 4 inches above ground level in front

The platform is most satisfactory when made of 3 inch oak planking This platform should be shaped at the corners and in two pieces, each approximately 17¼ inches in width and sawed the proper length to fit snugly, but not too tightly, in the angle iron frame

Figure 26 3 shows how this equipment is used to trim the rear feet

A more complicated device was designed and patented by Douglas Knight, a Holstein breeder, Sandwich, Illinois It consists of a vertical platform that can be changed to a horizontal position by means of a power unit The animal is strapped to the platform while the platform is in a vertical position The platform is then gradually rotated until it is in a horizontal position The animal lying in a prone position with the feet three feet above ground places them in a position to be worked upon Figure 26 4 shows the animal in a standing position and ready to be placed in prone position to have his feet trimmed

Irrespective of the restraining device used or the age of the animals, the feet should be trimmed so that the toes are short and well rounded, and the bottom of the foot is flat and rests evenly and naturally on the ground The art of trimming feet properly comes mostly by observations and practice Figure 26 5 shows a foot that has been properly trimmed

Some Clipping Is Required to Properly Present an Animal

It is seldom advisable to clip an animal over the entire body If some of the hair is extremely long with other areas short and

Fig. 26.3 Shows how two men working together can trim the rear feet of a cow. The cow is inclined to stand more quietly when two men are working at the same time than when one only is using the chisel.

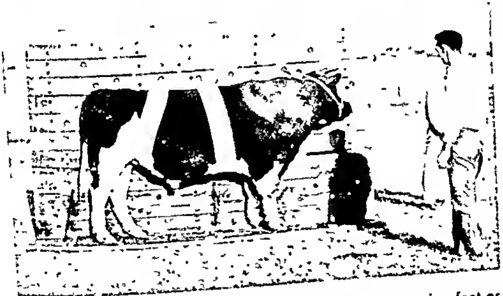

Fig. 26.4 This restraining device is especially desirable for trimming feet or operating on large animals. Large artificial breeding associations would find it highly useful. In this case the animal is securely fastened to the platform when in a standing position as illustrated. His head, body, and each leg are secured to the platform. Then the mechanism located behind the platform rotates it to a horizontal position, that portion of the platform on which the bull is standing drops down, and the feet are exposed for easy access. (Courtesy Douglas Knights, Sandwich, Illinois.)

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Fig 26 5 Th s shows the r ght fore foot of a young cow (2 years of age) that is in excellent shape The hoof is smooth, shapely and n cely rounded The toes are close together the sole is level rests firmly and evenly on the ground and the hoof is f rm and free of cracks

rough, and the time for fitting is short, it may be desirable to clip the entire animal. Even then do not clip animals that are thin in flesh, as clipping tends to make them look thinner When such clipping is necessary, it should be done six to eight weeks before the first show, or sale, except with young, well fleshed animals when it may be done any time before sale or show When the condition of the hair over the body is satisfactory, clipping should be done only on the underline (except in the bulls and heifers, especially Ayrshire heifers), on the neck and head, the tail, and occasionally along the higher processes of the back and over the withers It is the custom of Ayrshire breeders to clip only the heads, necks, and tails of their exhibition animals

In clipping the tail, do not clip too low on the switch (begin six to ten inches above the end of the tail bone), as clipping too low detracts from the appearance and symmetry of the animal Irregularities on the back may be made less conspicuous by clipping the hair short on the high spots and leaving it unclipped over the depressions If withers are to be clipped at all, they should be clipped from both sides in such a way that their sharpness will be accentuated

If Horns Are Present, Smooth and Polish

If horns are too long, from three fourths to one inch may be removed without much bleeding. Large horns and those that are badly marred should be scraped or rasped down until they are smooth and shapely. A small wood rasp is usually best for this purpose. Any marred places that still remain may be taken out with a horn scraper or a piece of glass. After the horns have been rasped, they should be smoothed with emery cloth, first with the coarse cloth and later with the fine.

Upon the smooth surface of the horn, place a thin coating of tripoli powder and sweet oil mixed to the consistency of a thin paste. Polish with a strip of flannel cloth. Two or three such applications and rubbings should bring out a very high polish. When time is limited, horns that have previously been smoothed down and polished may be given a thick coating of olive oil. This gives a glossy polish, especially at night, but such a polish will not last for more than half an hour.

Keep Show Animals Blanketed

The continued use of a blanket on an animal to be exhibited prevents soiling and staining, and makes the hair lie down more smoothly. It protects the animal against drafts and sudden changes in temperature, and in summer against flies and insects. A lightweight duck or burlap blanket is best for this purpose. In cold weather it may be desirable to use two blankets. An ordinary stable blanket with a flannel blanket underneath makes a good combination.

Care must be exercised in extremely warm weather to keep a blanketed animal from getting too warm. When the blanket is too heavy, especially if it is kept on the animal for a long period of time, the hair tends to come out, leaving small bare patches of skin.

Protect Animals against Shipping Fever

It is good precautionary management to protect animals against shipping fever when they are taken to a show or sale. Perhaps the best protection if done in time is injection with the bacterin. This should be done at least four weeks before the animals are moved from the farm. This method gives very little protection unless it

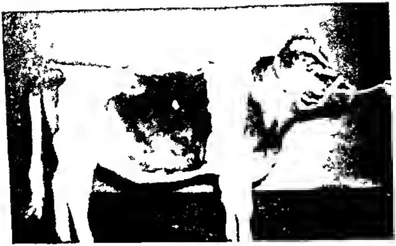

Fig 26 6 This shows a heifer that has been washed and is ready for clipping and preparing for a sale Her hair is long, the coat is rough, and the heifer lacks eye appeal Note the following Figs 26 6 through 26 9

Fig 26 7 The heifer shown in Fig 26 5 is having her head clipped Notice that the clipper is moved against the hair This makes clipping easier and cuts the hair shorter It requires some skill acquired by experience to clip the head effectively

Fig 26 8 Here the tail is being clipped Here again it is best to clip against the hair In this case the clipper was started about 8 inches from the end of the tail bone and continued to the tail head

Fig 26 9 In this case the top line is being smoothed off and the neck and wither clipped In clipping the wither the clipping at either side is downward or with the hair It is much less noticeable if done with the hair than if clipped close and against the hair On the topline clipping is done to leave a straight line rather than up and down with the contour of the body

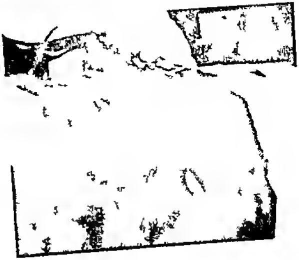

Fig 26 10 Shows the heifer clipped and ready to be presented at the sale Note how much more quality she shows in head and neck Observe how much smoother and well groomed she looks and how the eye appeal has been improved Yet this picture was taken in the same position and within 30 minutes after that of the picture shown in Fig 26 6

is used well in advance of exposure In the event that protection must be given just before shipment, the serum, not the bacterin, should be used It is best that either treatment be administered by a qualified veterinarian

Be Sure Health Papers Are in Order

Every animal that is to be exhibited or offered for sale should be in good health and free of communicable diseases Papers show-

ing that the animal is free of tuberculosis and infectious abortion should be obtained from the proper authorities If the animal is to be shipped interstate health papers must be provided Such papers can usually be procured through a local accredited veterinarian They should be arranged for well in advance of shipment

Exercise Care in Trucking or Shipping Animals

It is highly important that animals arrive at their destination in good condition The results of careful fitting can be lost in a single shipment if animals are not properly cared for when in transit Except in a new car or truck that has not been used for livestock shipments, thorough disinfection should precede loading Any of the ordinary disinfectants, such as carbolic acid, cresol, or lye, is satisfactory for the purpose Before such disinfectants are applied, the truck or car should be thoroughly cleaned out and scrubbed. After the surplus water has been removed, disinfecting materials may be used as a washing solution or sprayed on the sides and bottom of the car or truck. These same precautions apply to the transfer of animals from one herd to another It is only in this way that all communicable diseases can be avoided

Final Preparations for Show or Sale

These final suggestions for preparing an animal for the show or sale ring are especially directed to the junior exhibitor Experienced showmen repeat most of these operations each time they exhibit or sell an animal.

Wash Animals before the Show or Sale

In warm weather (temperature 70° F or above) wash in ordinary tap or well water If the weather is cool, it is advisable to use warm or tepid water With the Holstein Friesian and Ayrshire breeds that usually have a good deal of white on them and tend to soil badly, it is desirable to wash the entire animal In solid or self colored animals, it may be necessary to wash the soiled spots only

Use a good soap Grandpa's Tar soap is excellent for two or three washings With repeated use it tends to darken the white areas A washing soap with a bleach, such as Lux will avoid this difficulty Rinse the animal thoroughly, and remove the excess water with a scraper Complete the drying out process by cover-

ing the animal with a cotton or light woolen bed blanket. In warm weather this blanket may remain on the animal two or three hours or until the animal is dry. In cool weather the bed blanket should be covered with a stable blanket and left on until the animal is dry.

Braid Switches

The evening before the exhibition, wash the switches of the animals thoroughly with soap and water, and then dip them into a pail of water to which has been added a small handful of powdered alum. Alum water tends to make the tail fluffy when combed out for exhibition. Braid the switch into a number of small braids, and wrap these braids together and cover with a cloth to prevent soiling.

Withhold Water to Obtain Proper Fill

The evening before the show, do not allow animals that are to be exhibited to have normal access to water. The purpose in withholding water is to make reasonably sure that the animals will take on the desired "fill" at the time of exhibition. As an added stimulant to thirst, a double handful of salt should be given to each mature animal the night before the show. Approximately half that amount will be adequate for heifers.

Bed Down Heavily and Keep Animals Clean

While animals should be well bedded at all times, it is especially important to keep them clean the night before the show. Oftentimes an attendant is kept on duty during the night preceding the show to remove the soiled bedding.

On the morning of the show, animals should be cleaned thoroughly. The udders of milking animals should be eased off if necessary, preparatory to final bagging. This will tend to prevent "hiving," or the skin rising up in small welts over the body. At this time also get in readiness such equipment as halters, lead straps, bull staffs, etc. Pails should be filled with water, properly tempered, in readiness for use when animals are filled.

Study a Milking Cow and Bag Her Carefully

Great care should be taken in deciding how much milk an udder should contain to enable the animal to appear at her best. Usually cows are overbagged. The cow should be milked out before the

show or sale at a time so that the proper amount of milk will have accumulated when the animal goes into the ring This might be 6 hours or it might be 16 hours It is perhaps a good practice as a preliminary test to bag the cow a few days before she is to be exhibited As the udder fills, watch carefully, at not more than hourly intervals, so that you may note the proper time between milking out and the point of which the most desirable shape and size of the fully bagged udder is reached

Feed and Fill Animals Carefully

On the morning of the show, do not give a large quantity of feed at one time, as this tends to make animals sluggish Small amounts of grain fed at frequent intervals, together with the animals' desire for water, will tend to keep them alert

Usually about half an hour before an animal is to go into the ring, it should be filled This may be done with water or with a thin gruel or slop feed If the weather is cold, take the chill from the water, otherwise the animal will hump up its back and shiver Too much water is to be avoided, as it tends to distort the appearance of the body and makes the animal difficult to show Take charge of this operation yourself It should not be left to a stable boy who does not know when the animal is properly filled

Immediately after the animal is "filled," the horns should be given their final polish, the hair should be rubbed down, and the show halter put on The animal is now ready for the ring

Exhibit the Animal to Best Advantage

An animal should appear at its best at all times when in the ring If it has been well trained, it can be made to take and hold the various positions which have been selected as showing its good points to the best possible advantage While in the ring, keep your eyes on both the judge and the animals If it appears that a meritorious animal is not being noticed by the judge, an exhibitor can sometimes direct the attention of the judge to his animal by moving it into a more advantageous position This does not imply that an exhibitor should do this conspicuously or repeatedly but only so that his animal has not been "covered up" by other animals

The Best Exhibitors Are Always Gentlemen

The character of a man is often tested, in the show ring All competent judges are men of experience and high character Their

placings represent careful deliberation. Opinions differ on the merits and weaknesses of animals. Some persons place more emphasis upon a particular defect or desirable character than others do. Therefore, some placings are almost certain to be decided differently from others. Occasionally an animal is outstanding enough to overshadow competition, but more often decisions between animals must be made on minor points.

When an exhibitor enters an animal in a show and later exhibits it, he recognizes that, no matter where his animal places, he is expected to abide by the judge's decision. He may not agree fully with the placings, but, if he is a gentleman, he will not permit a display of temper to demonstrate his displeasure. In junior shows it is very helpful if well-meaning friends do not overrate an animal to its owner and therefore create a hope of success that is not warranted.

An exhibitor does not lose prestige by having an animal placed lower in a class than the majority opinion of the ringside feel that its qualities warranted. Oftentimes such an experience enhances the opinion of the better judges of the merits of the animal because it starts an exchange of opinions about the animal. But an exhibitor loses both prestige and friends if he permits a display of temper to bare that weakness of his character.

chapter 27

Creative judging and handling difficult judging situations

This question is often raised "Just how meaningful and creative is show ring judging?" It is a very proper question, and the answers to it will depend largely upon the point of view. To the exhibitors, exhibiting is meaningful, or they would not take the trouble to do it. Of course they have different reasons for exhibiting. Some do it for the glamour and publicity, others for the advertising, still others as a part of their program for herd improvement and development. A few show because it augments the farm income. Whatever the reason, the show ring has been sufficiently appealing to exhibitors to have survived for upward of 100 years.

The main question, however, involves the spectators at the ringside, the interest of people generally. What do they gain by attending the show? Have they learned anything new about cattle? Have they "firmed up" their concept of type? Have they gone home with a clearer understanding of the kind of cattle their breed is striving to develop? If their answer is yes to the last three questions, then to them the judging has been creative and meaningful.

Important Shows Determine Breeder Type Concepts

Dairy cattle breed associations have put much effort and spent a considerable portion of their revenue in developing score cards,

pictures, and models in an effort to acquaint breeders with the physical characteristics most desired in their breed. Their classification programs have likewise been aimed at the same basic target. But it is in the show ring that cattle are measured against each other, it is there that the best type is found, and it is at the major shows that type concepts are most likely to be formed.

In some respects the major shows resemble courts of law. The breed association sets up the policy, the laws as it were, and the judge attempts to carry them out. Thus any failure in a clear definition of policy places the judge in a situation where he is obligated to be guided by his own views. On the other hand, the policies of the association may be perfectly clear, and the judge may not properly interpret and abide by them. In any case, both the breed associations type policy or concept and the competence of the judge are basic to the conduct of creative and meaningful shows.

Summit Schools for Judges Should Deal with Policy, Not Be Practice Sessions

The judges or potential judges who are invited to summit schools are expected to know the strengths and weaknesses of cattle. What they do not know, and desire to learn, is the basic policy of the breed with regard to such qualities as size, the type of cow that is to be favored, the weaknesses of the breed that need correction, and the degree of emphasis that is to be placed upon them. They are definitely interested in the kind of cow the breed is striving to develop and the degree to which selection pressures are to be applied.

Furthermore, the success of such conferences rests upon the consistency with which the committee works. For example, if the committee stresses strength and durability in one class, and in the next they emphasize a small frail cow because she has a good shape of udder, the participants become uncertain. If this is repeated with respect to other qualities, those in attendance leave the meeting without any assurance of policy or firm ground to stand on when they are called upon to judge a show. To be sure, there are problem cases in judging, and individuals differ in the manner in which they handle such cases, but most problems of this nature are relatively unimportant. The real problems of judging deal with concepts and the consistency with which they are followed. It is a case of: What is the policy? What does the committee believe? What do they stand for? Do their decisions uphold their views?

These are the type of questions that should be dealt with in the summit schools for judges

Characteristics Associated with a Judge in the Show Ring

The judge who officiates in a show ring should possess a good knowledge of cattle He must be able to make decisions quickly and with a high degree of acceptability, or he will not receive many invitations to judge He must convey the impression of sincerity and freedom from external influence, and he ought to inspire confidence

A Good Judge Works Calmly When under Tension

To inspire confidence, a judge must be composed, his motions deliberate and meaningful His system of judging should enable him to view all the animals with a minimum of effort It isn't that tensions do not exist, they do, for they are at the ringside, among the exhibitors—even the animals themselves show stress The judge feels it too, but he more than any of the others must not show it Indecision, often demonstrated when a judge shifts animals back and forth in the line, never inspires breeder or public confidence in a judge A competent judge will have his concepts and his objectives clearly in mind and be able to recognize quickly animals that conform to them.

An Effective Judge Follows His Concept of Type

If a judge has a clearly defined concept of the kind of animal he prefers, his placings will follow that concept Not all shows, of course, provide the necessary animals to enable a judge to find what he is searching for In such cases he must make compromises by recognizing that not all good animals follow the same type pattern Fortunately, a judge can check the consistency of his placings by observing his first place winners when they appear for the championship If they are all of the same type and look like each other, except for age or differences in development, he has been consistent in his placings

The ringside may not always agree with the individual placings of a judge who has a good concept of type, but they can consist-

ently follow his placings and understand his reasons for making them. They will in such cases respect his ability. The kind of animals he chooses must, of course, be basically sound; otherwise, his judging is not constructive and beneficial to cattle improvement.

A Judge Must Remain a Campased Gentlemen When under Criticism

Occasionally a situation will arise when opinions differ and an exhibitor may temporarily lose his temper. At such times a judge will gain stature by recognizing the right of another to differ with him. If necessary he will calmly and clearly explain his reasons for making the decision as he did, but he should refrain from entering into an argument or a heated discussion. Above all, he must not let the incident influence his decisions either for or against the exhibitor in subsequent classes.

Very rarely a judge may be accused of favoritism. Although such a criticism may be both unfair and unjust, it should not disturb the judge. The judge better than any one else knows if the criticism is valid. If it is untrue, the criticism will only injure the one who makes it. But, if it should be true, then the judge should take charge of his conscience and either correct the situation or quit judging, for he is rendering a disservice to himself and the show ring.

Dealing with Difficult and Unfamiliar Situations When Judging

Every show and even every class within a show may have in it the potential for creating a situation. Experience is very helpful in setting up precedents for dealing with unusual problems of this character. A discussion of the nature of some of these problem cases should be helpful in preparing a judge to meet almost any situation that may arise.

When the Class Is Too Large to Be Judged in the Area Available

Frequently in the senior calf and yearling heifer classes the space in an arena allotted to the judging is too small to handle the class. This condition can create a very confusing situation and slow down the judging of the ring. There are several methods that may be used to handle this situation.

A judge cannot observe the animals in a class effectively unless he can see them all side view, with the leaders having enough room to move and pose their animals This usually requires at least three or four feet between each two animals when they are standing head to tail If this cannot be managed, then there is a serious space problem Basically there are five procedures that may be used in such cases The judge may (1) place the animals in two concentric circles and observe the animals as best he can while judging, (2) scan the animals quickly and send those that are least desirable to the barn and judge the remainder in the regular way, (3) pick out enough of the best animals to more than fill all of the available prizes, line them up in the center of the ring, and send the remainder to the barn, (4) scan the ring quickly and make two separate lines (he will put what he deems to be the better heifers in one line and the less desirable ones in the second He will then shift heifers from one line to the other in making his placings) (5) Before judging at all, the judge may ask one half of the leaders to form a line next to the barrier on one side of the arena He will then work over the animals in the remaining group in the regular way, using all the arena Next he will ask this group to move along the barrier, and he will work the first section in a similar manner Having thus seen all of the animals without confusion and with ample room to maneuver, he can choose the better animals from each group, move them about in the center of the ring, and make his placings Of the five methods mentioned, probably no 5 is the most satisfactory Perhaps it requires a little more time than methods 2 and 3, but it has the advantage of permitting the ring side and the judge an opportunity to view all of the animals Furthermore, it enables the exhibitors to feel that their animals have had an equal opportunity, and the judge is much less likely to overlook a deserving animal.

Evaluating Udders with Defective Quarters

It is not often in a major show that an exhibitor will bring a milking animal into the ring with a visibly light or defective quarter What is much more frequent is that the exhibitor will permit milk to accumulate in one or more quarters of an udder for a longer period of time than in the remaining quarters and thus tend to balance or even up the appearance of the quarters If the cow is in the later stages of her lactation, this may not be very important because cows tend to dry up differently in the various quarters of

the udder. But, if the cow has recently calved, the condition may be more serious and often is a permanent udder deficiency.

If the cow is a contender for first place, the ring should be milked out. The judge should be very careful and determine that each quarter of the udder was milked completely empty. If milk has been left in the deficient quarter, as it often is, then the judge should be suspicious of the balance and soundness of the udder and insist that all of the milk be removed before a final decision on the placing is made. This is equally important in the purchase of an animal, especially at an auction sale. If the purchaser is suspicious of the soundness of an udder, he either should not purchase the animal at all, or insist on a complete milk out, and then decide whether or not the animal is as represented, before it is paid for and removed from the farm or sale.

Detecting an Unsound Fore Udder Attachment in a Dry Cow

In a milking cow, defective front udder attachments usually show up sufficiently to be observed. But, in a dry cow, this defect is much more difficult to detect. When judging, be very suspicious of the attachment of a fore quarter if the end of that teat hangs an inch or more below its mate. It is easiest to detect this when the cow is in side view and moving slightly toward you. You are then viewing the udder from the front. If this condition is noted, then the udder should be carefully examined for strength of attachment. More often than not, it will be found that the front attachment of that quarter of the udder is defective.

Detecting Weak Toplines (Low Backs)

The general topline anatomy will usually provide a clue to topline weakness. But some animals, when they are in motion, do not show the defect. Therefore, if the exhibitor of an animal never permits it to take a pose but keeps it constantly in motion, the judge should become very suspicious of its topline. In such cases it is well for the judge to move on down the line and away from the animal. He may examine several animals carefully, paying no attention at all to the one suspected and then gradually move around the animal that is being examined so that the suspected animal is in the line of vision at the other end of the arena. Usually the leader of the suspected animal, feeling secure, will permit it to

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See Chapter 13 for suggestions on how to handle these defects and other problems when judging.

Handling Great and Famous Cows That Are Out of Condition

Occasionally a very old or extremely stale cow is exhibited in the open class, only because the owner is required by rule to show her in order to qualify her for a group. Suppose, for example, that the cow bad been grand champion at the National Dairy Show two years before but clearly, through no fault of her own, cannot make a creditable showing on the present occasion. In such a case, it is a courtesy for the judge to permit the owner, after having checked this famous animal into the ring and thus qualified her for the group, to withdraw her from competition before the ring is placed. Usually an owner will be very happy to avail himself of this privilege.

come to rest, and then the topline will settle down and assume a normal position.

Wing shoulders and other form defects may be revealed by a somewhat similar method.

Discovering Crampiness, Especially in Older Bulls

Crampiness exists in various degrees, but it is usually progressive and, if present at all, will probably grow worse as the animal ages. Crampiness usually shows up when an animal first starts to move after standing still for a time or, if the animal is turned around rather quickly. If the animal possesses the defect, it will show it by raising the leg, usually a hind one, and holding it up for an instant, and thus display a hitch in the first forward step. When once in motion, the animal usually moves with normal action.

The defect is objectionable, and the animal, even if only slightly affected, should be discriminated against. More severe cases require more serious discrimination.

Detecting Wry Faces, Wry Tails, and Parrot Mouth, etc.

Occasionally, otherwise outstanding animals are exhibited that possess some weakness which the exhibitor rather hopes that the judge will not discover. A wry face falls in this category. Wry faces can be covered up quite well if the exhibitor stands with his body or arm close to the animal's head, especially the shorter side of the face. The judge should always be especially careful if he detects an exhibitor standing, and continuing to stand, in an unusual position in relation to an animal. In this case the judge should move directly in front of the animal and examine the head front view.

Parrot mouth is a condition in which the lower jaw is less well developed, noticeably shorter than the upper jaw and, if the defect is severe, interferes with an animal's eating, especially when at pasture. This defect is easiest to identify if the head is viewed from the side. It is important to carefully observe an animal for this defect when purchasing, especially at sales. The condition is heritable and is often found in families of cows.

The condition known as wry tail consists of the tailhead being located either slightly to the right or left of its normal location. This condition is also heritable, apparently as a recessive, and is most easily observed when standing directly behind the animal.

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chapter **28**

Escaping mediocrity and standardization

In the mechanization of an industry, it is necessary to standardize many processes Fabrication and assembly are made easier by a standardization of parts There is much to be said in favor of standardization If it had not been for standard parts and assembly-line mechanization, few could enjoy the experience of owning and driving a car Without it, few could afford the products they are employed to produce But standardization cannot invade the biological field as it has the industrial. Each cow or bull is a custom product There is no other one precisely like it No other exactly takes its place Another individual may be better or not as good but, except perhaps in identical twins, it does not duplicate it

Furthermore, animals reproduce themselves, and the reproductive process has been well planned and well controlled by natural laws In nature's program two things are highly important (1) new generations, and (2) a certain amount of variation. To these, from man's point of view, should be added a third namely, the importance of summit or ceiling competence Stated another way—maximum biological efficiency For it is from this small segment of the population, the group that has been endowed with superior germ

plasm, that improvement in the average level is most likely to come.

Factors That Encourage Mediocrity

When a group of animals is subjected to a limited environment or measured by minimum standards, the most capable are not properly identified. For example, if a class of 50 students in physical education were to be tested for speed by walking a mile at an average pace, almost all of them would reach their destination at essentially the same time. If, however, the class was instructed to proceed at a slow jog for a mile, there would be considerable difference between arrival times, but still an appreciable number would arrive at the same time. Now, if the instructor tested the class by outlining the course and explaining that the objective was for each to travel the mile as rapidly as he could, there would be a great difference displayed in the ability of the students. The students with the most speed and stamina for that distance would thus be located. This example has an application to dairy cattle improvement.

Limited Feed Intake

In herds where feed is inadequate, the animals do not develop to their genetic capacity. Consequently, the size and, to some extent, the type and conformation are adversely affected. Although such animals tend to be mediocre in size and probably also in type and value, genetically their potential is unaltered.

Economically, such animals from a yield or production point of view may be desirable units in the herd; their general acceptance, however, has been unfavorably influenced.

Limited Environmental Opportunity

Aside from the influence of plane of nutrition, management practices can definitely hamper the development of an animal. Group feeding without regard to age or size of animal tends to favor the larger animals. Tersely stated, it may be said: "It makes the large larger and the small relatively smaller."

It is difficult to differentiate, without a case history of the animal, between animals that are small because of inheritance and those that are small because of a poor environment. Most generally the animal is criticized for both and is considered mediocre.

Outbreeding

Outbreeding tends to make animals more heterozygous than line breeding or even random mating. In general, outbreeding has a good reputation among breeders. In a below average herd, it has a beneficial effect, but, in a herd with a considerable number of outstanding animals or in a distinctly better than average herd, expected results are not so desirable. For outbreeding tends to produce mediocrity. It is desirable only if you are content to have your herd hover around the average of the breed or race.

Failure to Recognize Merit

The outstanding qualities of an animal must be recognized before they can be used in herd or in breed improvement. The following incident illustrates this point. A well known breeder and an excellent judge of cattle was traveling down a little used Wisconsin road and happened to see a cow standing on a small manure pile. Something about the cow caused him to pull up on the roadside and take a better look at the animal. This closer look caused him to go back to the house and contact the owner.

The cow was thin, covered with long hair, and standing knee deep in mud, but our friend saw a great potential in her. He bought the cow, took her home, gave her good feed and care, and saw her favorable response. Subsequently she was grand champion at the National Dairy Show. She later contributed some excellent progeny to the herd and breed. Had she not been recognized, she would have lived and died as a mediocre animal.

The Significance of Summit or Ceiling Competence

If there is no improvement from generation to generation in the quality and competence of the best animals within a breed, sooner or later the breed will tend to reach status quo. On the other hand, if the best animals within a breed keep on improving, the average level of the breed is likely to continue to improve. This fact is illustrated in Figure 28.1.

You will note that the level of ceiling competence is the same in both groups when the program is begun. The difference between

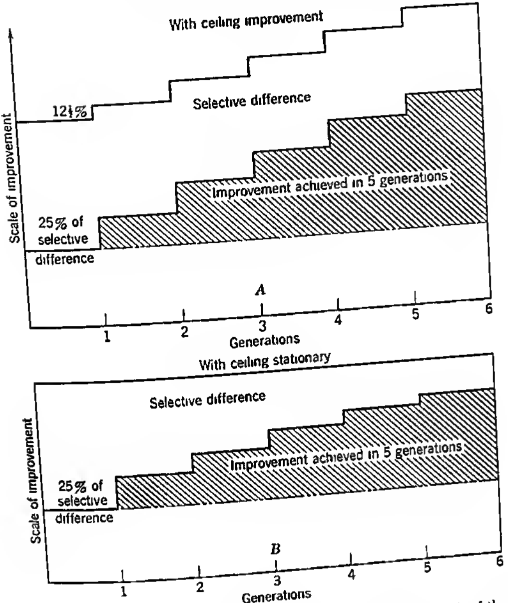

Fig 28 1 This graph is based upon the assumption that roughly 25% of the difference between the production of daughters and dams is heritable. It is further presumed that ceiling competence is more difficult to achieve than average competence, and so that figure is reduced to 12½%. Therefore, the greater improvement in the group with ceiling change is due to the larger selective difference or opportunity within that group. If the genetic ceiling remains constant, then the selective opportunity is sharply reduced in each new generation. In a herd, this selective difference is achieved largely by the introduction of new and better germ plasm, mainly through improved sires.

the two graphs is that in *A* the ceiling is being raised in each generation by improving the competence, whereas in *B* no such summit progress is being made. As a consequence, not only is more generation-to-generation improvement made in *A*, but progress continues and does not ultimately reach status quo. It is true that progress becomes slower as improvement proceeds, but raising the

ceiling sets up a situation that permits some generation to generation improvement for an indefinite period

Making the Best Use of Superior Germ Plasm

Germ plasm or inheritance that produces distinctly superior animals in either type or yield, and especially if in both, should be used wisely If the best germ plasm is used across the board equally on poor, average, and good females, without regard to a program of breeding to provide replacement with equally good germ plasm, then much of that germ plasm will tend to be eroded into mediocrity Stated another way, when the animal with that superior germ plasm is gone, none with germ plasm of equal or superior value will have been recreated to take its place

It is true that great improvement can be made in a large number of animals in one generation by this general use of the best germ plasm, but as a result the reservoir will be empty, and there will be no similar supply available from this source to refill it Therefore, the first claim on the best germ plasm should be for ceiling or summit use, to replenish or improve the basic supply After that need has been fulfilled, then a general use of the remainder of the best germ plasm may be made to improve mediocre animals

The Inherent Danger in Standardization

One of the consequences of equalization or standardization is that it must occur at the lower levels of competence By definition standardization requires some kind of authorization that either requires or compels conformity to a level or standard Obviously if general conformity is expected, the requirement must be such that whatever it may be it can be met by a large portion of the population

The tendency under such a program is to stress the importance of the average or that fraction which conforms to the standard—which is, in fact, stressing the importance of mediocrity The average cow plays a tremendously important part in maintaining the cow population, but the poor cow and the good cow provide the key to dairy cattle improvement—the former because she can be sacrificed and her poor germ plasm eliminated, the latter for ceiling level improvement

Thus, in the end, the outstandingly good and extremely bad both play an important role in raising the standard of excellence of dairy cattle.

Standardization procedures and correction factors in dairy cattle are based upon average performance. Their value, especially the former, in the operation of a herd rests primarily upon a simplification of procedures, speed-up of operations, and the lowering of unit costs through increased productivity. If they accomplish these things for the dairy enterprise, then their emphasis is justified. However, the tendency is to overwork the idea and to expect too much from the application of such procedures.

Those who push the idea too far have a tendency to look upon dairy cows simply as machines—machines that will respond to the same set of situations or standardized practices precisely alike. This is an unrealistic point of view as each cow is a separate entity and responds best when her individual qualities and characteristics are properly recognized.

Standardization procedures such as converting all records to 2× milking, 305-day production on mature equivalent bases are all designed to add to the accuracy of estimates. If the factors used are truly applicable to the group studied, their use adds some additional validity to the conclusions. If, however, such correction factors are not applicable to the population studied, then the results tend to be misleading, and the estimates less valid. For example, average age correction factors or classification ratings applied to early-maturing, well-developed, and highly conditioned young cows have a tendency to overrate the animals. They are, therefore, not as good as they appear to be. Conversely, the same correction factors applied to slow-maturing animals, which usually are highly desirable in a herd, underrates them. They are actually better than they appear to be.

What we are saying is that standardization procedures and correction factors should be used by persons who understand their implications and know when and how they should be applied and interpreted. Furthermore, the best cows are seldom able to demonstrate their full talents under merely average opportunity. Breeding for type and production involves a talent search; a search that faithfully and accurately reveals those animals that rise above the common herd. For it is by such animals that the type and production ceiling are most likely to be raised. The dairy industry should be truly thankful for the uncommon cow.

In Conclusion

The ideas that have been presented in this book have been gleaned from many sources. Whenever possible they have been the product of research and experimentation. But oftentimes it has been from the tested experiences of the best breeders and cattlemen of the land that the facts have emerged. In every case the truth has been sought. If the sources from which the truth has been revealed tend to disturb you, just recall these lines from Robert Louis Stevenson:

Who has seen the wind?
Neither you nor I
But when the trees bend down their heads,
The wind is passing by.

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